POPULATION EDUCATION FOR QUALITY OF LIFE

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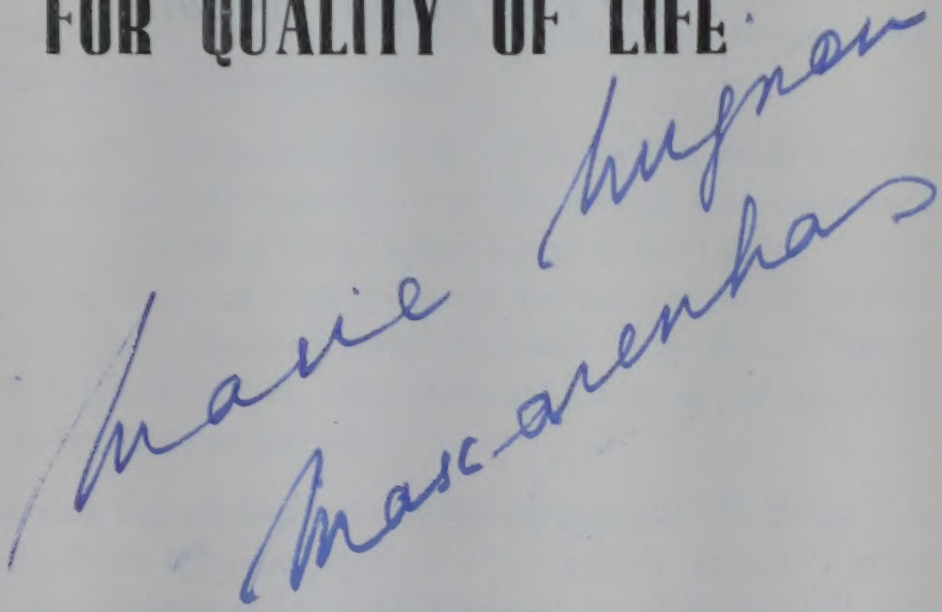

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INDIA

DEDICATED
TO MY FAMILY AND MY COUNTRY
MAY I BE WORTHY OF BOTH

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PREFACE

I embarked on this major task with the sole idea of being able to serve those who have to plan and carry out a teaching programme in the field of Population Education, in particular at High Schools and Colleges in India.

The research and preparation for this book was made possible by the award of a Fellowship from the British Commonwealth University which enabled me to spend a year at the London School of Hygiene and Tropical Medicine at the London University and for which I can never sufficiently thank Professor L. J. Bruce-Chwatt, OBE, MD, MPH, DTM & H, the dynamic Director of the Ross Institute at the London School.

I also owe a great debt of thanks to Professor W. Brass, MA, Head of the Department of Medical Demography at the London School. His guidance and constructive criticism together with that of Mr. John Simon and Mrs. Kay Bispham (of the Department) were invaluable and I thank them most sincerely.

I thank Professor V.K.R.V. Rao for the honour he has done me in writing an Introduction.

I express my thanks to Fr. Thomas of the Pauline Press for undertaking the printing.

I wish to record my gratitude to my husband for his suggestions and constant help. I thank Dorothy Boyes, Jane da Costa, Hazel Haliburn and Susan Loder for typing the manuscript.

Bangalore
August 15th, 1974

MARIE MIGNON MASCARENHAS

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INTRODUCTION

Population Education is a new subject that is coming into vogue in educational circles; and it has been sponsored not by educationists and pedagogues but by demographers, family planners and others concerned with the rapid growth of population in developing countries and wanting to bring about a reduction in the birth rate. Because of this mixed parentage of a well-meaning but over-anxious father and an indifferent but somewhat prudish mother, population education has not as yet taken off the ground. In fact it is still to be born as a healthy and vocal infant. **I, therefore, welcome all attempts to give flesh, bones and blood to the concept of population education and particularly welcome this pioneering attempt by Dr. Mrs. Marie Mignon Mascarenhas to give a new look to the subject by linking it with the quality of life rather its mere arithmetic.**

There is no doubt that the current rate of population growth in the developing world from 2.0 to 3.5 per cent is making the task of economic development much more difficult than would have been the case if the growth rate of population had been of the same dimensions as in the developed world. The object of economic development is not just an increase in national income, but an increase in the per capita income with the possibility that it provides for an improvement of the quality of life of the individual citizens who constitute the Nation. If population is growing, say at the rate of 2.5 per cent a year, then an increase of national income by 2.5 per cent will leave the per capita income unchanged and consequently provide no opportunity for an improvement in the quality of life in spite of a significant increase in the national income and the developmental effort involved therein. An outstanding example of this was provided by India which had an increase of 43.8 per cent in its national income during the decade 1951-1961 but could only have an increase of 18.3 per cent in its per capita income. Again, during the decade 1961-71, India's per capita income rose only by 12.9 percent though its national income increased by 42.1 per cent. That is why there is so much concern in India about the growth rate of its population and so mnch stress laid on family planning programmes in Government's efforts to stem this growth.

A rapid growth of population in a developing country also leads to a number of other problems as has been expounded in Mrs. Mascarenhas' book. A large share of the additional national income resulting from development has to be spent not only on food and other basic physical necessities but also on additional schools, dispensaries, hospitals and other minimum social requirements. The larger drift to towns and cities caused by increasing population leads to urbanization of an undesirable sort in the developing countries with slums, disease and crimes along with an increase in the unproductive expenditure needed to sustain urbanization. Increasing unemployment with all its political and social consequences, is another unwelcome product of increasing population in a developing country. Savings and investments do not grow with the inevitable result that the economic growth rate declines, and poverty tends to perpetuate itself instead of being eliminated and replaced by rising standards of living. There are more mothers, and more mothers have more children ; and more children have less of the things that give quality to life. Population control is needed not just to make food, clothing and housing available to the people ; it is needed even more to create social harmony, give hope and zest and joy to living, and improve the quality of life for both men and women, and for both children and parents.

How does population education come into all this ? It does by creating the necessary psychological and behavioural climate for inducing newly married couples to take to family planning for spacing their children and restricting their number. The fact is that while family planning programmes provide facilities for various types of contraception, they do not necessarily ensure the utilisation of these facilities by the persons concerned. As Keynes used to say in another context, "You can take the horse to the water trough but you cannot force it to drink water". In the same way, we can create facilities for providing condoms, foam tablets and pills. abortion, I.U D. insertions, vasectomy and tubectomy, but they will not be used unless men and women in the reproductive age groups are motivated to do so. It is this lack of motivation that is proving the greatest obstacle in the successful implementation of family planning programmes. And crash programmes for motivation directed towards adults do not yield the desired results.

The fact of the matter is that creation of the necessary motivation for family planning and population control is a long

term process that takes many years to come into effective operation. Human behaviour is a very complicated process and is influenced by a multitude of factors, economic, sociological, cultural, traditional ecological, political, religious, etc. and it is no easy matter to bring about change in its operation, especially if it is to be of a sustained character or hold good over a long period. This is especially so when the subject of change concerns such a personal and intimate aspect of human behaviour as marriage and reproduction. That is why policy makers interested in making a success of family planning are now turning to population education as one possible instrument for producing the desired results.

Population education is a tricky subject. It has to begin at an early–enough age to leave a lasting impression on the psychology of the student when he grows into adulthood and joins the reproductive age group. The main thrust of population education should be not on the prospects of starvation and the negative force of fear, but should be on the prospects of giving children a better deal and bringing more happiness in family life and the positive force of an improvement in the quality of life that can be brought about by population control. Population education should have the further qualification that it works indirectly rather than directly for creating a consciousness of the population problem in the student. Population education is not sex education, but it must bring out in unambiguous terms the fact that in the modern world, the birth of children need no longer be involuntary but can be the result of deliberate choice and, therefore, subject to planning and control.

I have pleasure in commending Dr. Mascarenhas' book on Population Education, particularly to those who would have the responsibility for teaching this new subject to students of higher secondary schools and colleges.

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PART I

Population and Demography

THE DYNAMICS OF POPULATION IN INDIA

— EVOLUTION OF POPULATION
— POPULATION STRUCTURE
— WORLD DEMOGRAPHIC TRENDS
— POPULATION BY AGE & SEX

General Background & Evolution of Population

India forms a natural sub-continent with the Himalayas to the north and flanked by the Arabian Sea and the Bay of Bengal. The Union of India consists of 21 States and 9 Union Territories. India has a parliamentary system of government with a bicameral legislature and a President and Vice-President.

India has 2.4% of the world's land area and 14% of its population. The density per square kilometre is 164. The population of India is expected to double itself in 27 years, at the present population growth rate. It adds 13 million annually to its population and during the period 1965-70 it increased by 67.9 million.

Life expectancy is 57.3 years for males and 56.0 years for females.

The Population of undivided India, according to a rough estimate, was about 130 million in A. D. 1600. During the next 2½ centuries (1850) the numbers, according to rough estimates, increased to about 150 million as high birth rates were nearly matched by high death rates.[1]

Currently India's population is almost equal to that of the population of the U. S. A., U. S. S. R. and Japan put together. It is estimated that 55,000 babies are born every day in India. Each year there are approximately 21 million births and 8 million deaths. Consequently, 13 million people (more than the population of Australia) are added every year to the population. The population of women in the reproductive age period–childbearing age – is about 20% of the total population. In 1971 the census recorded a population of 547 million. With the current rate of growth 2.4%, the population is expected to exceed 700 million by 1981. This is the population explosion faced by India.[2]

It is interesting to note here that it is the fall in the death rate due chiefly to advances in medical technology, that is responsible for the large population we have. Over the years the variabilities in population can be gauged if one goes through some extracts from the census reports about the health and economic conditions prevailing during those days before 1961. About the decade 1901-11 the then Census Commissioner reports that the decade might perhaps have been regarded as an average one from the point of view of public health had it not been for the ravages of plague from which India had been practically free until it broke out in Bombay in 1896. The mortality from it rose from about a quarter of a million in 1901 to 1.3 million in 1907. It fell below a quarter of a million in each of the next two years, but in 1910 it exceeded half a million. The total number of deaths from plague during the decade was nearly 6.5 million. This, moreover, is only the recorded mortality. As is well-known, where epidemics are raging the reporting agency breaks down and a large number of deaths escape registration. The omissions are most numerous in the native states, where the

registration is usually far less than in British territory". Plague revisited India during the decade 1911-20 and caused heavy mortality. According to the estimate of Census Commissioner 1921 more than three million lives were lost. Coupled with the epidemic was the scarcity of food during 1911-1920, which also resulted in severe loss of human lives. Writing about the food situation of the country the 1921 Census Commissioner observed : "the monsoon of 1918 was exceptionally feeble and gave practically no rain after the beginning of September. In the Punjab and Central and Western portion of the continent the crops failed over considerable areas and scarcity, aggravated by the high level of prices, was declared in parts of the Punjab, United Provinces, Central Provinces, Bombay, Bihar and Orissa, while agricultural conditions were equally bad in parts of Hyderabad and Mysore States". Again "the monsoon of 1920 was poor ; the autumn rains failed and the winter rains were in defect".

But during all this period the most severe blow came from the Influenza pandemic of 1918 which invaded India in two distinct waves. " It is no exaggeration to say that at the worst period whole villages were absolutely laid desolate by the disease. There was sometimes no means of disposing of the dead ; crops were left unharvested and local official account was largely paralysed, owing to the fact that the majority of the official staff was put out of action by the epidemic. To add to this distress the disease came at a period of wide-spread crop-failures ". There are no statistics available to which the direct result of influenza may be ascertained. However, it is estimated that over seven million lives were lost in 1918 in areas which were under registration. To this another 1.3 million deaths in 1919 may also be added. This puts the total mortality from influenza in the registration area at over 8 million in two years. "Even this, however, must be a substantial under-estimate, since owing to the complete breakdown of the reporting staff, the registration of vital statistics was in many cases suspended during the progress of the epidemic in 1918 and when the time came to reconstruct the figures, the number of

omissions especially in the case of women, must have formed a high proportion..... In any case the figure given above applies only to the areas under registration which contained little more than three quarters of the population of India". The epidemic was especially virulent in Rajputana (now Rajasthan), Punjab, Central India (now Madhya Pradesh and the adjoining areas) Bihar, Orissa, Kashmir, Mysore (now Karnataka) and United Province (Uttar Pradesh of now) for which no trustworthy statistics were available. The total mortality due to this epidemic was "between 12 and 13 millions for India".

After going through the above description the reader will not find it difficult to understand the cause of the slow movement of population before 1921 and particularly between 1911 and 1921. In contrast to this after 1921 we do not find any important natural calamity which could seriously affect the growth of population. Applauding the antifamine measures the Census Commissioner for India 1921 wrote that "Famine Relief Organization is so highly perfect in India that scarcity is not necessarily accompanied by high mortality". His successor in 1931 said : "Improvement in communications, and consequently in ease of distribution, now-a-days prevent anything like the famine-mortality of a century ago". As for the epidemics, the records are furthermore clean. We do not find any serious outbreak after 1921 on all India level.

Of those who had witnessed these epidemic ridden years, hardly a few might have realised at that time, that population growth in future would become a problem for the country's economic and social progress. Their minds must have been so obsessed with the fear of the reoccurence of the epidemics that yearning for health and longer life must have been a universal desire.

The post-1921 period witnessed a rapid population growth and 1951-1960 decade broke all the previous records. In 1951-1960 India's population increased by 78 million persons ; more than 6 times the population of Australia and New Zealand in 1960."[3]

THE DEMOGRAPHIC PICTURE OF INDIA

STATISTICS	1950	1960	LATEST AVAILABLE FIGURES
Area			3,268,090 sq. kms.[1].
Total Population	360,950,365	439,072,582	547,367,926 (1971)[2].
Population Growth Rate	1.3% (1941-50)	2.15%(1951-60)	2.46% (1966-70)[3].
Birth Rate	41.7 per 1,000 (1951-61	41.0 per 1,000	37.5 per 1,000 (1971)[4].
Death Rate	27.4 per 1,000	22.8 per 1,000	15.6 per 1,000 1971)[4].
Infant Mortality Rate	183 per 1,000 (1941-50)	146 per 1,000 (1951-60)	113 per 1,000 1966-70)[4].
Women of fertile Age (15-44)			117,651,000 (1970).[5]
Population Under 15			42% (1972)[6].
Urban Population	17.3%	18.%	19.9% (1971)[2].
GNP per capita			US$ 110 (1970)[7].
GNP per capita growth rate			1.2% (1960-70 average)[7].
Population per doctor	5,700	5,800	4,610 (1967)[1].
Population per hospital bed			1,671 (1965)[1].

1. UN Statistical Yearbook, 1971.
2. India, 1971-72 Publications Division Ministry of Information and Broadcasting Government of India.
3. Programme Information. 1971-72 MOH & Family Planning, Government of India.
4. Date from Population Census, 1 April 1971.
5. UN Demographic Yearbook, 1971.
6. Population Reference Bureau, World Population Date Sheet 1972.
7. World Bank Atlas 1972.

The Study of Population Structure

There are many good reasons for wanting to study population and in our context, population education. Among some of these might be firstly administrative utility, for e.g. tax collection, the planning and conduct of industry and commerce, the provision of social and educational facilities. Secondly, its value from the humanitarian point of view with the specific aim of bettering the lot of man, or at least to ensure that it has not worsened in an intervening period. This is frequently associated with the resources needed by the people, for example, food, shelter, mechanical power and the like. Finally there is the academic aspect of population studies to satisfy the need of intellectual research, for example, to find out why things happen as they do.[4]

According to Harrison and Boyce "Human beings like most other organisms are not distributed randomly over the surface of the earth, but tend to be grouped into clusters or populations. Typically these populations are themselves structured : they are organized with a definite form and though the patterns of this form may change with time, it has continuity. In other words, populations are not merely conglomerations of individuals, but rather, although to different degrees, ordered coherent systems which have an entity greater than that of the sum of the individuals of which they are composed."

There, not only biological and cultural components of structure but the inumerable determinants of this structure are broadly classifiable as biological and cultural. Admittedly some factors, such as geographical and environmental conditions which may profoundly affect population distribution and density are not clearly ascribable to such categories but even these can often be thought of as manifesting their effects through the inherent requirements for human life. On the other hand, cultural factors must be regarded as ultimately consequent upon biological ones. Social organization is a function of social behaviour and this is a biological property of the species.

So far we have referred to population, as though they were defined only in spatial terms; if not as clusters of people separated by relatively uninhabited areas from other clusters or at least as groups around which spatial boundaries can be drawn. These of course are the concepts of populations most commonly used. But for many purposes populations are defined in terms other than those of spatial continuity or discontinuity. In particular here may well be constructural heterogenity within the population of any one place, such as the vertical limits of social class, and people in different places may, from certain points of view, belong to a single populace, for instance those who share a common religion.

It is important to note here that most population concepts invole a hierarchical classification, in which units are defined in terms of the extent to which people are embraced by common characteristics. For example, in the simplest situation the population of the world is made up of the populations of different countries, each of them made up of the populations of states, counties, districts, and so on. Because there are many factors determining the ways populations are defined, hierarchies taking all factors into account must be multi-dimensional and in the overall viewpoint the situation may be much more like a continuum of overlapping categories than a series of clusters. However, whilst it is possible to consider populations in these terms impractical considerations are recognised according to some particular component which is of interest. And the major components on which one focusses are demographic, genetic, social and ecological.

Demography, essentially, provides a methodology which can meaningfully be applied to many situations which are not primarily concerned with population definition. On the other hand, demographic structure, in terms of patterns of fertility and mortality, emigration and immigration and the effects of these on age and sex composition, are of vital concern when considering the dynamics of population which have been recognised for other purposes.

Genetic or Mendelian populations are defined by the extent to which individuals share in a common gene pool. In other words, they are determined in terms of degrees of biological relatedness. The smallest Mendelian group consists of parents and children within the nuclear family, as these show the maximal degree of relationship; and the largest, of the whole species, since all the members of the species, because of their reproductive isolations from one another, have for ever different gene pools.

In many aspects of sociology and social anthropology, population units may be solely defined in terms of point of view, and workers in these fields can be as arbitrary as the demographer. However, there is certainly a social parallel to the genetic concept of population with people sharing to varying degrees common cultural heritages. And implicit in defining groups for many sociological and anthropological investigations is the concept of a hierarchy of socially defined populations such as band, clan and tribe or occupation or social class.

From the ecological viewpoint population can be seen in terms of the extent to which people share in exploiting and developing the same environmental resources – to put the definition in similar form to that used for genetic and social units. This is not inconsistent with the more common viewpoint of an *ecological population* as a *group of people interacting with one another*, usually in some cooperative form in a particular habitat, and it more clearly indicates the potential if not the real, hierarchical nature of ecological groups.

Just as there can be an interrelation between a social population and a genetic population so may each be interrelated with an ecological population, which is primarily defined by mating pattern, is clearly determined on the one hand by the social factors which affect mate collection (and which also define a social population,) and on the other by environmental factors which affect population distribution, density and movement and which help to define an ecological population.

It can be argued further that social organization is to varying degrees affected by ecological conditions, both natural and man-made, and therefore that the definition of a social population is influenced by ecological conditions. Conversely, social factors determine the nature of habitats and available resources, and the levels of interaction between peoples, and to some extent genetic factors, may play a similar role. We might therefore expect a rather broad correspondence between populations defined for genetic, social and ecological purposes. Sometimes indeed, a population defined singly for one purpose may embrace a number of populations when seen from other viewpoints. This is especially so for ecological situations and it seems likely, for instance, that an ecologist looking at the interaction between man and his environment in relation to economics in many parts of the world and especially in multi-racial and class-structured societies, would define a population which from both the social and genetic points of view would be very heterogeneous and comprised of multiple populations.

Because they are so intimately determined by social and ecological factors the units in a hierarchy of Mendelian populations are always likely to be no greater and often will be smaller than the units of social and ecological hierarchies.

At the moment, there are few, if any, population scientists ; only various groups of demographers, geneticists, sociologists, and ecologists interested in population problems and under these circumstances it seems right to anchor on the background disciplines. All the contributions, however, do relate directly or indirectly to the determinations or consequences of the demographic structure of populations. In demographic structure the interactions of the various determinants are most evident and many aspects of genetic, social, and ecological structure influence, and are influenced by, population size and distribution, movement, patterns of fertility and mortality. In addition to this central role of demography all the

contributions attempt to interlink aspects of other viewpoints, some provide integrated case studies and the chapters on ecology deal with the interaction of man with his environment in a very wide context.

From a biological viewpoint, the study of man, though often fraught with difficulties as compared with the study of animal populations, has one great advantage, in that through written records it is possible sometimes to give a historical time-depth to the structure of a population.[5]

By the term *"Population Dynamics"* is implied not only the numbers of people that constitute the population, but also the rate of movement and change of population through time.

The term *"Stable Population"*, on the other hand, presents a static picture. If a population has a fixed age and sex distribution, its constant mortality and fertility rates are experienced at each age and if there is no migration, then the population is said to be stable.

The word "*Demography*" is derived from two Greek words demos *the people* and graphos *to draw or write.* Demography is used today to denote the study by statistical methods, of human population and deals primarily with their size, growth and/or diminution, the numbers and proportions of persons living, being born or dying, within some area or region at a particular date in addition to the measurement of such related functions as rates of fertility, mortality and marriage.

In general, demography is limited to studies of human populations that are influenced by the above demographic processes.

In general there exists 3 main sources of data and statistics used by a demographer. There are "census counts, vital registration, and other sources, for example, migratory records from the immigration departments and ad hoc studies".

"*Census*" taken from the Latin word for count, is an "inventory of the population" – details and characteristics of the individual members of the population such as age, sex, occupation, race, address, whether native or foreign born, religious affiliation, whether married, single or widowed, place of birth and relationship to the head of the household (e.g. wife, son, daughter, mother etc.) in which he or she normally lives; or more simply a census can be defined as "The total process of collecting, compiling and publishing demographic, economic and social data pertaining at a specified time or times, to all persons of a defined territory".

The second way by which a demographer seeks to measure population is to record the events that cause it to change. This method is known as **Vital Registration** and it pertains to the registration of vital events such as births, deaths, marriages, adoptions and divorces in a permanent record.

Thirdly, data obtained from "other sources" of information are records of migratory and other passenger movements without which a complete tally of population change is impossible. In more developed countries statistics may be obtained from the operation of social security schemes—although restricted to certain sections of people—which are quite comprehensive. Finally, there is always the possibility of making special ad hoc enquiries to obtain particulars that would not otherwise be readily available for e.g. sampling of one kind or another.[6]

World Demographic Trends

" Overnight in human history, man has achieved a considerable capacity to put off death while continuing to procreate at very close to his ancient and once essential high levels. "[7]

At the dawn of the agricultural revolution, some 8000 to 10,000 years B.C, the population of the world probably numbered somewhere between 5 and 10 millions.

The organization of land resources for agriculture. characterized by the practice of cultivation and the domestication of certain animal species, is a factor in demographic expansion, just as much as is the urban revolution which first appeared in the Nile valley and Mesopotamia about 4000 BC.

Estimates of world population at the beginning of the Christian era are very uncertain, varying most frequently between 150 and 300 million, probably nearer the latter figure if one can accept the 54 million inhabitants which Belloc attributes to the Roman Empire in the year 14,the 71 million which Durand gives for China in the year 2 and 100 – 140 million considered by K. Davis as a plausible figure for India in the second century B.C.

The estimates for the beginning of modern times are much less variable. Taking the figure of 553 million which G. Olin gives for 1650, it can be seen that there is only modest growth during the first 17 centuries of the Christian era, the population only doubling itself over the period.[8]

By about 1850, world population was about 1000 million or 1 billion. **The second billion was added in just another 75 years.**

By 1960 (that is, in about 35 years) the world population was 3 billions.

The present world population of around 3500 million (1969) is increasing by nearly 70 million annually. At the current rate of increase, *the number of human beings will tend to double in about 30 years.* [9]

The growth percentage for 1965 – 70 was 1.98%. United Nations estimates are that world population will grow by 2.04% in the 1970 – 75 period.

TABLE 2.8. POPULATION PROJECTIONS FOR SELECTED COUNTRIES, 200 A,D.

In millions.

	1960	2000
Federal Republic of Germany	53	63
France	46	62
United Kingdom	53	62
Netherlands	12	17
Belgium	9	11
Italy	50	64
Turkey	29	85
United States	183	319
Canada	18	35
Soviet Union	214	353
Brazil	71	215
Colombia	16	51
Mexico	35	145
Nigeria	50	165
Congo	14	22
Tanzania	10	36
China	650	1,043
Japan	93	122
Korea	35	90
Taiwan	11	25
India	433	908
Pakistan	93	227
Thailand	26	81

Source : Jean-Bourgeois-Pichat, *Population Growth and Development* (1966).

The century we are living in began with a world population of around 1½ billion, and it will end with around 6 billion or more.

"The present population explosion started in Europe and the same factors which reduced its death rate have

now spread across the world so that the populations of Africa, Latin America, South America and Southern Asia continue to expand. There are, however, certain differences. The rate of decline of death rate in technologically advanced countries was a gradual process beginning towards the end of the 18th century, and it took some 50 years for the death rate in Britain from 20 (in 1870) to 14 per thousand (in 1920). In many of the countries (e.g. India) now attempting to emerge from Agrarian cultures, the same reduction has been accomplished in a much shorter time.

A second difference between the technologically advanced countries and those that are emerging, is that the accelerated growth of the former found relief to population pressures by emigration to North America, Australia and New Zealand during the demographic transition. Soon there will be no empty lands to emigrate to, and this outlet is denied to Asian and African emigrants.

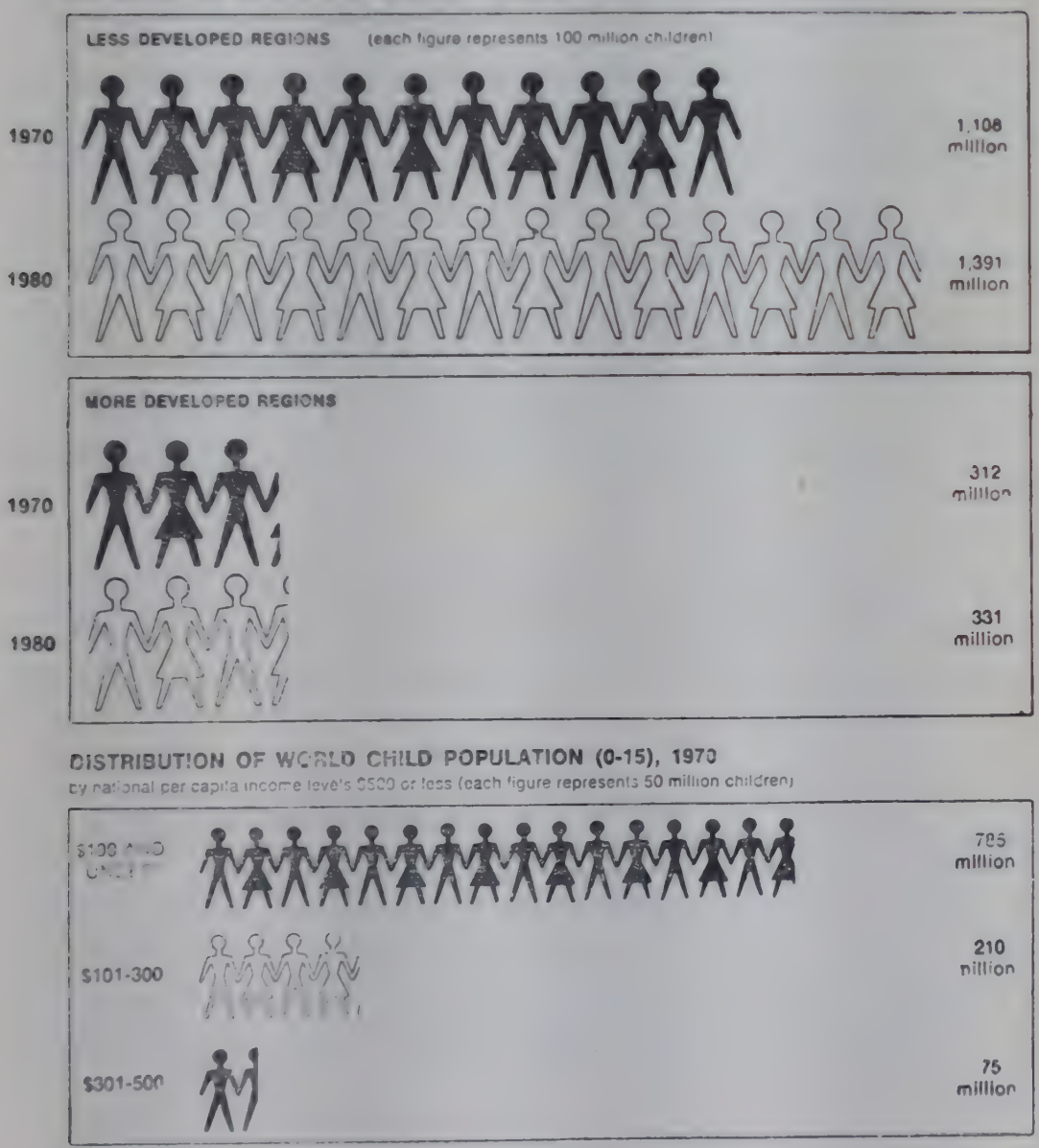
A third difference is that such countries as Latin America, Africa, South Asia, North America, the U.S.S.R. and Europe have recognised the need for birth control. Accordingly, if present trends are maintained, the world will be divided into two groups. One will comprise the demographically stable industrialized nations with a relatively high standard of living and in which fertility regulation is recognised and practised. The other will be the demographically unstable, larger subsistence level countries, now struggling towards economic development''.[10]

Population gain in the *Third World* will be increasingly significant. The Third World describes a group of developing countries which contains almost two-thirds of the world population. Geographically it includes nearly all the countries of Africa, the Middle East, Asia and Latin America. It excludes South Africa, Israel and Japan.

It is a pertinent fact that approximately 40% of the population in the Third World is below 15 years of age. In another 10-20 years this enormous wave of youngsters will have reached their peak child-bearing years.[11]

COMMUNITY HEALTH CELL
326, V Main, I Block
Koramangala
Bangalore-560034
India

WORLD CHILD POPULATION 0-15 YEARS OF AGE



DISTRIBUTION OF WORLD CHILD POPULATION (0-15), 1970

by national per capita income levels $500 or less (each figure represents 50 million children)

"Asia looms large in the world's annual population increase, accounting for 60% of the total increase. China claims half and India, a quarter of this increase. If the present rate of growth continues until 1975 (and it is reasonable to presuppose that there will be no great changes in the present trend during this relatively short period), Asia's population will increase from 1500 to 2000 million "[12]

According to the theory of vital evolution, population moves through 3 stages : (1) an agrarian low-income economy characterized by high birth and low death rates (India's position until recently) ; (2) a decline in death rates while birth rates remain steady (India is in this stage) ; (3) a decline in birth rates and the establishment of a small family pattern. In the West economic development anticipated demographic growth. Moreover, changes in the type of economy, e.g. from agricultural to industrial are themselves considered to cause modifications in the population of a country.

The present-day situation is that, in agrarian economies, the death rate is falling in advance of the economic changes and rise in income that preceeded the fall of the death rates in the West.

The population of the developing regions will increase by over 100% in the coming 3 decades, while the population in industrialized countries by just under 40% in the same period. At present, nearly two-thirds of world population is living in Africa, Asia and Latin America, but before the end of this century nearly four - fifths will be found in these countries.

The population of the developing countries as a whole is currently growing at about 2. 2%per annum or more than double that of the industrialized countries. In Africa and South Asia the average annual rate of growth is around 2. 5% and in Latin America 2. 9%.

It is quite certain that these high growth rates will be maintained throughout the 1970's and they are actually bound to increase somewhat in the first half of the new decade. Later on, the rates of growth may gradually slow down in South Asia and Latin America depending in particular, upon the success of measures which are or may be taken, of population policy ; but according to the most plausible United Nations estimates (medium variant) the growth rates will still be 2.0 and 2.5% respectively in the 1990's. "In Africa, however, there is little prospect of an early fertility decline, and the rate of growth, there in coming decades will tend to increase from 2.5% to 2.7% by the end of the century."[13]

Similar to the theory of vital evolution is the **Theory of Demographic Transition** which, in the opinion of some experts, are periods or stages of change every country goes through, before its population is stabilized or its own particular pattern of growth established.

This Theory of Demographic Transition states that "as a nation industrializes, its mortality rate declines first ; while the birth rate, through the application of the technology of birth and death control, is attenuated later. The lag in time between the decline in rates accounts for the extraordinary rapid population growth in developing nations. Before transition begins, there is an initial condition of high birth but also high death rates which yields a population in a state of stationary numbers or very slow growth. Typical of non-industrial societies, cultural patterns sanctioning high fertility do more than just offset high mortality ; they also provide a large labour force to enhance production in the agrarian economic system.

As public health and medical technology brings a decline in mortality, the population grows more rapidly, because fertility remains at a relatively high level. In part this is because the desire to control death is nearly a universal value and can be greatly affected by public measures. Birth rates,

however, are not as amenable to induced change and the factors supporting high fertility tend to remain. Nations characterized by these demographic conditions tend to be in the process of urbanization and industrial development.

In developed societies a relative balance between fertility and mortality is typically re-established. However, unlike the earlier condition where birth and death rates were high, both rates are relatively low. The important difference, of course is the decline in the birth rate which is indicative of a complex of personal and social factors that precipitate fertility control. There is now no nation on earth that has not already begun at least the early stages of this process, but there are relatively few nations that have already completed it.

The stages in the demographic transition can be summarized as follows (Bogue 1969)

I **Pre-transitional** – little regulation or control either of death rates or birth rates, with the consequences of high vital rates but also no growth.

II **Transitional** - death rates and birth rates are in the process of being reduced.

a) **Early Transitional** – death rates are being reduced but birth rates remain high and may even rise higher because of the improved health of the childbearing population.

b) **Mid-transitional** – both death and birth rates are being reduced with birth rates remaining higher than death rates.

(c **Late-transitional** – death rates are low and unchanging or declining very slightly while birth rates are moderate to low and fluctuating or declining. Knowledge of contraceptive methods is widely diffused throughout the population.

III **Post-Transitional**—both birth and death rates are low, contraceptive methods are at most universally diffused and used to keep vital rates in near balance; growth is quite low or approaching zero on a long-term basis.

Wertheim started a working device for the measurements of demographic transition. This is named the *Whertheim Test*

40 – 50 per thousand – birth rate of developing countries

15 – 20 per thousand - birth rate of developed countries

The various stages of demographic transition are :

Primitive Level — High Birth Rate and High Death Rate

Developing Committee — High Birth Rate and Low Death Rate

Developed Countries — Low Birth Rate and Low Death Rate

By way of summary, the following points can be made.

1. Every industrialized nation of the world is now in the low mortality category and future improvements in mortality can be expected to be very minor and gradual.

2. Very great reductions in mortality have been effected in Asia, Africa and Latin America through campaigns against infectious diseases, especially malaria, smallpox, cholera and plague. Where the conquest of these diseases has been accompanied by a rising level of living, the result has been a very sharp decline in mortality, such as in Singapore, Taiwan and Mexico (Bogue 1969).

3. Although mortality decline will continue, further reduction will come somewhat more gradually and more

in proportion to societal socio-economic improvements (Bogue 1969). Malnutrition, poverty and illiteracy are major barriers to quick reduction of mortality in large segments of the population in South Asia, the Middle East and in Africa.

4. In general, industrialization is universally related to fertility. Nevertheless, while every industrialized nation of the world is now in the low-mortality category, nations with the lowest fertility control are not necessarily those that are the most industrialized or the most urbanized or have the highest level of educational attainment (Bogue 1969). The requisites for national fertility control are more diverse and difficult to determine than for mortality control.

Speculations as to why populations of the more developed countries tend to have an effectively implemented desire to control their numbers of births have included several possibilities (Coale 1967).

1. A decline in the death rate increases the proportion of children surviving and reduces the number of births needed to achieve a given family size.

2 In an urban industrial society, children are less of an economic asset and more of an economic burden than in a rural society. The economic disadvantage of children is increased by laws restricting child labour and making education mandatory.

3. Modernisation raises the status of women, increases their relative educational level and broadens the opportunities for employment outside the home. These changes compete with the continuation of uncontrolled fertility.

4. In rural agrarian communities where education is non-literate and transmitted within the family, behaviour is apt to be determined by custom, role and tradition ; in urban industrial communities the forces of tradition are weaker and the influence of secular rationality stronger.

The relative contribution of these and perhaps additional hypotheses to the total explanation of fertility decline is one of the salient foci of social demographic research.

It is important to emphasize some basic generalizations which are relevant to the above data and discussion.

1. The primary cause of current rapid population growth (the 'population explosion' in many nations of the world) is the decline in the death rate.

2. The basic logic is that under conditions of industrialization, there is a marked tendency for the technology of death control to be applied earlier and more extensively than the technology of birth control. Later and less predictably the technology of birth control, may be employed to reduce the rate of growth and bring about a new condition of equilibrium (Cowgill 1963). In France, however, the Birth Rate declined before the Death Rate.

3. The technology of birth and death control is applied first and most extensively in the upper social and economic classes and only somewhat later is it applied with equal vigour within the lower classes. Thus, while birth and death rates manifest a similar decline, there tend to be differentials between social classes (Cowgill 1963).

4. Another general pattern has been for urban birth rates to decline first, resulting characteristically in a differential between urban and rural birth rates for the same region (Cowgill 1963).

5. However, with the recent advances in the control of infectious diseases, social class and geographical differentials in mortality rates are declining.

6. In fact, an important feature of a developing country today is that it can remain backward in

many aspects and yet match the crude death rates of most advanced countries (Peterosn 1969).[14]

Population Parameters are useful measures for studying population changes.

" The size and age composition of the human population is a reflection of the sum total of the following factors : –

a) The birth rate, which is a social factor rather than a biological one.

b) The age at which sexual maturity is attained – this varies between individuals, but within a population occurs within a more or less restricted age range.

c) The length of the gestation period in so far as it influences the potential productivity per individual female.

d) The length of time for which an individual is reproductively viable – this is governed in health by factors (b) and (c).

e) The longevity of individuals affects the age composition of a population and is regulated by ecological considerations.

f) The mortality rate, which is either determined by physiological or ecological factors.

g) Immigration of individuals from neighbouring populations.

h) Emigration of individuals to other populations. Factors (f) and (h) are mainly consequences of ecological pressures, either on individuals or on groups of individuals. [15]

Some measurements that are used frequently in Demography are the Crude Birth Rate or simply the Birth Rate

which is defined as "the numbers of live births during a year per 1,000 estimated midyear population."

The Birth Rate is the most common measure of fertility or reproduction of children.

The Birth Rate is a ratio and is represented thus:—

$$\text{Birth Rate} = \frac{\text{No. of Live Births during the year} \times 1000}{\text{Estimated mid-year population}}$$

It is a crude measure because the denominator is the total population (of all ages and sexes) whereas it is only those women who are in their childbearing age generally taken as between 15-44 years that are exposed to actual childbearing, (though in some instances it is taken as between 15–49 years.)

(The Birth Rate in India is 38 per 1000 Any figure over 30 per thousand is today considered a high Birth Rate. From 20–30 is considered moderate. Below 20 indicates a high degree of control.)

Among the factors which keep the Birth Rate in India high are

1. "The universality of marriage.
2. Early marriages and longer period of childbearing (illegitimacy accounts for a negligible numer of births.)
3. Widespread absence of Family Planning especially in rural areas."[16]

The Birth Rate would be even higher were it not for

a) Return of wife to parental home for the first delivery and a stay sometimes extending up to several months thus avoiding pregnancy.

b) Prolonged breastfeeding and Lactation Amenorrhoea with suppression of ovulation.

c) Comparative rarity of remarriage of widows.

d) Periodic abstinence for religious and cultural reasons.

In Western society, the decline in mortality was eventually followed by a decline in fertility. The response was not rapid, and in most European countries there was a slow but accelerating decline in mortality throughout the 19th century, and it was not until the last quarter of that century that fertility began to follow suit.

$$\text{The Death Rate (D. R.)} = \frac{\text{No. of deaths during the year}}{\text{Mid-year population}} \times 1000$$

The D. R. is a crude measure of mortality. It is crude because the denominator in the ratio which expresses it takes the whole population irrespective of age, and if the population is composed of old people it will naturally be high.

The D. R. in India is 14 per 1000 population. D. R.'s over 20 are considered high and indicate poor health and living conditions. D.R's of from 9-13 per 1000 are characteristic of mature industrialized countries. The high population of young people in India (40% population is below 15 years) partly obscures the true picture.

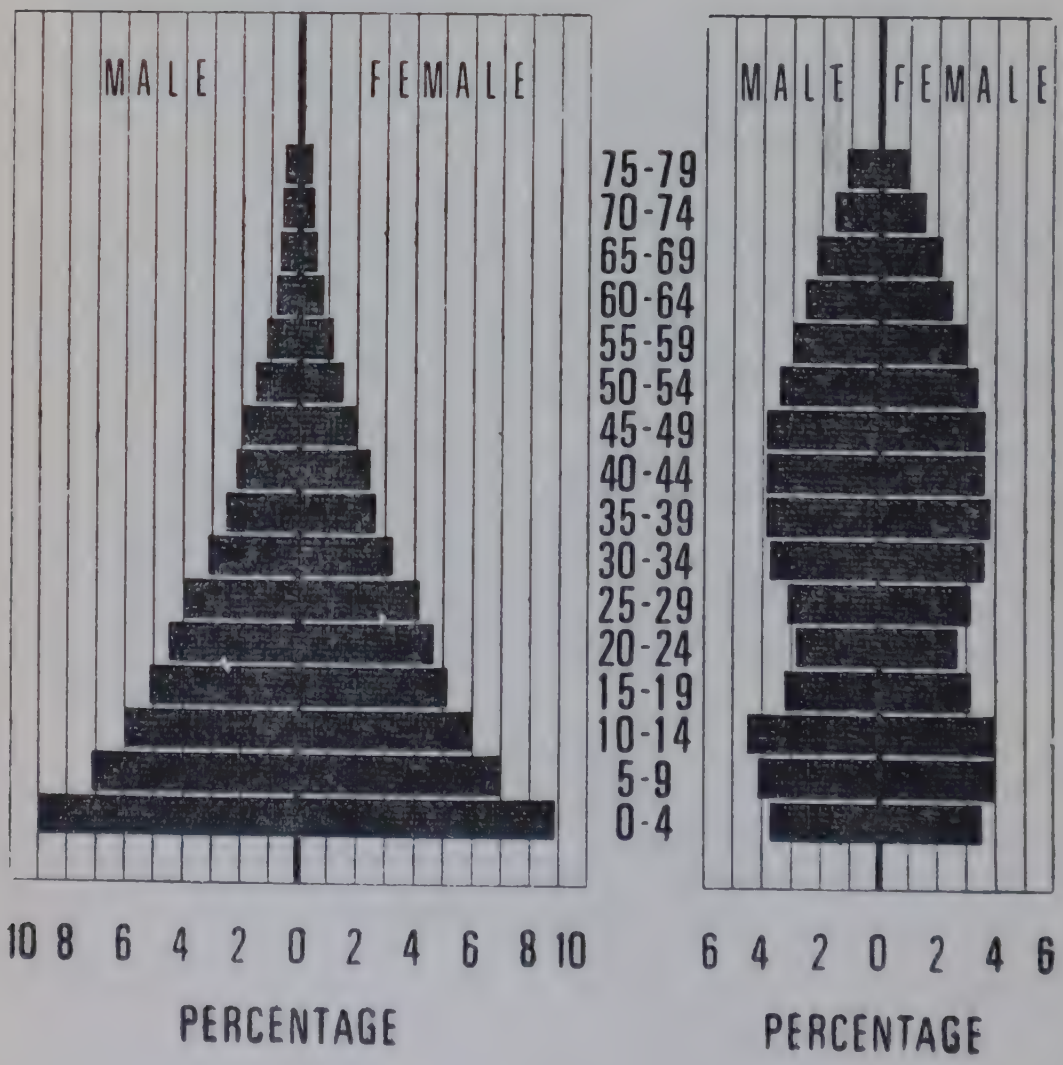
The Infant D. R. or Infant Mortality is the "most sensitive index of social welfare and of sanitary improvements which we possess." Though still high (90 per 1000 live births in India) it has been reduced significantly over the last 25 years.[17]

$$\text{Infant Mortality Rate} = \frac{\text{No. of Deaths under 1 year}}{\text{No. of live births in mid-year poulation}} \times 1000$$

POPULATION PYRAMID

in

Underdeveloped Countries & Developed Countries



Population by Age and Sex

For several reasons and both for planning and knowledge it is important to know not only the size of population, but also the composition of population as regards to age and sex structure.

Such a composition is well represented by a bar graph known as the Population Pyramid. Countries with high Birth and Death rates have age–sex pyramids that look like a drawing of an ancient Egyptian pyramid. Such a population will have large numbers of children and young adults and small numbers of people over 45. These Population Pyramids have different shapes according to the age and sex structure of the population.

These bar graphs or pyramids show the distribution of a population by age and sex at a particular period of time. The youngest age is at the bottom of the graph and the oldest age at the top. The left side of the pyramid shows males and the right side shows females.

The horizontal axis of the pyramid tells us what percentage of the total population is represented by each bar. Sometimes actual figures are used instead of percentages. When the population pyramids of 2 areas are being compared the same scale is always used for both. That is why percentages rather than actual figures are usually used for comparing pyramids.

Population Pyramids in countries with comparatively low Birth and Death rates are elongated when the proportion of children and young adults is low while the proportion of people over 45 is high.[1]

Age and sex are the two basic biological characteristics of a population that exercise considerable influence on the various aspects of the composition and structure of a population. The importance of age is obvious. A person's age is the decisive factor in such questions as the age at which a person can or must enter school, or the labour force, exercise his/her franchise, get married and retire.

The age structure has a direct repercussion on the death and marriage rates, the economic and occupational composition of a population and certain cultural and social activities of a community.

According to the 1961 Indian Census , 40.2 percent of the total population was in the 0-14 age group, 47.9 percent in the 15–49 age group and 11.9 percent in the 50 and over age groups.

Thus young and more fecund people predominate in India's population. This means that a relatively large burden rests on the productive active population and that population numbers are bound to increase at an even higher rate than they have done in the past.[19]

Common terms or names given to certain age groups are as follows :-

Infancy is the period from Birth to 1 year
Childhood is the period from 1 year to 14 years
Teenage is the period from 13 years to 19 years
Adolescence is the period from 11 years to 14 years
Adulthood is the period from 18 years to death.[20]

Importance of the Sex Ratio. A sex ratio is an index of the sex composition of a given population. It helps to indicate the relative proportions of the male and female components.

The sex ratio in India, which is defined by the Indian census as the number of females per 1,000 males after the definition adopted in the U.K. (and unlike that in the U.S. where it is the number of males per 100 females,) is as follows for the last 8 census years.

Year	Females / 1000 males
1901	963
1911	953
1921	945
1931	940
1941	935
1951	947
1961	941
1971	931

The relative scarcity of females or the excessive masculinity of the Indian population has been a significant feature of Indian demography.

There is some controversy over this phenomenon and it has attracted considerable interest from demographers and social scientists. The present study quoted here is an attempt to highlight some of the aspects of the sex composition based on SRS (Sample Registration System Policy) data collected through the SRS.

Partly due to severe loss of men in World War II and partly due to control of maternal mortality, the Western countries now experience the phenomenon of high proportion of women in the population.

In India it is observed that the pattern of sex ratio in rural areas in age-group 20-34 years is excess of females indicating migration of males. The age specific death rate by sex is another indicator showing the pattern of mortality by sex. It is observed that in the group 0-4 years, females have higher mortality than males. Gradually, the differences between sexes

gets narrower till the middle of the teen years. Thereafter from age 15 onwards, when the females enter the reproductive period, the mortality of females is more than males.

In developed countries, the sex ratio tends to move in the direction of a balance until, at a certain point, females begin to outnumber males. On the Life Table this point is known as "Cross Over Age" and so the ratio of females to males almost invariably increases with age.

In India, the overall sex ratio of deaths indicates that more male deaths take place than female deaths in urban areas contrary to that in rural areas. Some of the plausible reasons for this excess of male deaths relative to female deaths in urban areas might be male migration and the risks involved for males in their daily avocation. Also the fact of higher maternal mortality in rural areas due to lesser availability of medical or health personnel. (Over 90% of deliveries take place in hospitals or health centres and clinics in urban areas and the remaining minority occur in the home. This position is reversed in rural areas, where antenatal care is also less provided and availed of).

The sex ratio of the rural population exhibits geographical variation. The Southern States have low sex ratio as compared to Northern States. The sex ratio at birth also exhibits the same geographical pattern as the general sex ratio indicating deficit of females in the Northern States relative to the Southern States.

To summarize, one can say that the sex ratio of the India population (females to males) has been decreasing since the beginning of the century.[21]

There are 3 possible explanations for the high masculinity ratio in India.

1. The Secondary Sex Ratio (at birth) is low, i. e. more males are born.

2. Sex Selective Migration -- more males migrating to the cities.

3. Sex Selective Underenumeration of females.

4. Higher mortality amongst females — due to pregnancy delivery or their increased susceptibility to infections.

In Westermarck's History of Human Marriage it is maintained that a mixture of race leads to an increase in the proportion of females whereas inbred or pure – blooded societies produce an excess of males.

The sex ratio which is affected by past fertility, mortality and migration, plays an important role in determining the birth and death rates of a community. Females have a lower death rate than males in Western countries. In India it is the reverse though more recent figures show that female expectation of life at birth is rapidly equalling that of the male.

According to Coale there is a choice between explaining the recorded masculinity of the Indian Population by assuming that the subordinate position of women caused their omission from the census or by assuming that it caused their death in childhood.[22]

The sex ratio at conception, birth and maturity, are known respectively as primary, secondary and tertiary, but data on primary ratio are not always available or exact.

The sex ratio is of interest to the study of at least the following reproductive processes.

Spermatogenesis

The sex of a foetus is known to be determined by the nature of the spermatozoon which fertilizes the ovum. It is

possible that more male-producing (Y carrying) spermatozoa are produced than are female producing ones (X carrying). Indeed, Shettles (1964) has claimed to have found two discrete populations of spermatozoa, the smaller, round head and the larger elongate head present in normal seminal fluid in an overall ratio of 2 : 1 round head to elongate head. This, he suggests could explain the preponderance of male foetuses, if the rounded sperm were Y and the elongated X.

Sperm Access To Ovum

It has been suggested that the Y sperm, whether due to innate properties or environmental conditions, is more likely to reach the ovum, thereby increasing the probability of a male conceptus (assuming that the process of fertilization is random). Such differential access could be due to a variety of factors, including the longevity, activity or mass of the sperm itself, or various characteristics of the vaginal and uterine environment.

Fertilization

The process of fertilization is as yet little understood and it is therefore possible that one type of sperm is favoured during the process.

Implantation

4½–7 days after fertilization, the fertilized ovum now developed and called the "zygote" must be implanted in the uterine wall. It has been suggested that one type of zygote is favoured during this process.

Gestation

It has long been thought that the sex ratio of abortions and still-births is relatively high (Stevenson and Bobrow 1967), and it is therefore generally considered that there is a

differential wastage of male foetuses during the entire period of gestation. The sexing of early foetuses is difficult and few data are available but such differential wastage of male foetuses could be of great importance to the sex ration at birth (Mikamo 1969).[23]

Birth

More male babies are born than female babies in all parts of the world. According to Coale and Hoover the sex ratio at birth rarely exceeds 106 males per 100 females anywhere in the world.

It has been suggested that male babies are subjected to greater trauma at birth, possibly due to their larger size. It has been observed that the risk of dying is more in the case of male infants than female infants during the period of one week after birth.

(After 4 weeks, however, male infants have a greater chance of survival than female infants. Greater care of the male child is an important factor in this finding.)

To conclude these considerations of age and sex, it must be emphasised that approximately 40 %of our total population is below 15 years (50% is below 20 years). This formidable and dependant group needs in aspects educational, nutritional, health and recreational are joined by another approximately 20% of the total population of pregnant women whose nutritional and health needs are equally important.

In health planning considerable attention must be paid to the priorities of this group where age and physiological demands merit special attention and which if adequately provided for, will have a beneficial effect on the population as a whole both in regards to quantity (whereby the decrease of infant deaths may lead to a smaller family size) and as to quality (whereby the needs of growth and development are fulfilled).

Mortality Patterns by Age and Sex

The mortality curve by age has a U-shape; high in the first year of life, declining rapidly in the second and third years until age 9; remaining low until middle age; then increasing at a rapid rate during the older years (Bogue 1969.) The character of the curve for developed and less-developed countries is much the same; however, the mortality rates at all ages are lower in developed nations. This is notably true for infant mortality rates. In fact, in high-mortality populations, infant death rates form the largest single age category for mortality. (Bogue 1969). Even in low-mortality populations, the number of deaths during the first year of life may not be reached again until approximately age 65.[24]

The major difference between male and female mortality occurs at the weaning period, i.e. 6-24 months of age. Judging by the death rates at this period, malnutrition was more pronounced among female than among male children. The Khanna Study (Punjab) recorded 74 deaths per 1000 population among females, compared to 50 per 1000 among males taking the first five years as a whole.

The gap between male and female mortality is greatest at the reproductive ages. This may be due to high fertility, which increases the rate of maternal deaths, particularly in the absence of good maternal care. This hypothesis is supported by the evidence available for the Hutterites, a small fundamentalist sect in the U. S. and Canada, whose members do not practice birth control and have a very high fertility rate. Due to a good health service, the general level of mortality of the Hutterites is very low, but even though maternal deaths are few, mortality among females in the childbearing ages is higher than that of males at these same ages.

The most plausible explanation for this mortality, is that a high number of pregnancies lowers a woman's resistance to illness inspite of moderately good maternal care. It

has also been suggested that repeated pregnancies followed by prolonged lactation periods will, among other things, produce sustained needs for high quality protein in the diet. If these needs are not met, the result is what Jelliffe has termed the *"maternal depletion syndrome."* This results in premature aging and early deaths among females."[25]

In the absence of reliable evidence it is difficult to say whether this adverse sex ratio reveals any genetic trait in the Indian population. Some maintain that it is merely an underenumeration of females.

However there is reason to believe that life expectancy for females is rising in India.[26]

Growth Rate or Rate of Natural Increase

The growth rate which is the excess of births over deaths, is often expressed as a percentage in any one year. It is obtained by subtracting the death rate from the birth rate. (38-14 = 24 per 1000 or giving a percentage of 2.4).

The gap or difference between the birth rate and the death rate is also known as the **"Demographic Gap"**, a term coined by Vance.

Population is currently growing at a high rate in some of the industrial countries. In the U. S. and Canada, in Australia and New Zealand and in the U. S. S. R. rates of growth are between 1.5 and 2% per annum.

To put it simply Clarke says "Three main demographic forces influence the patterns of population dynamics; natural increase or decrease; distributional inertia and human mobility. There can be little doubt that on a world scale the first two forces are most powerful, but at a local scale the importance of human mobility has increased immensely.

Natural change of population has probably never offered more real variations than at present, owing to declines in mortality and fertility at various times and rates during the 19th and 20th centuries. In consequence, even at national level natural increase varies from about 0.0 per thousand (E. Germany in 1968) to 55.2 per thousand (Kuwait), and within countries even wider differences occur. In countries like Britain and the U.S., both experiencing overall natural increase, there are large areas suffering natural decrease, and even within an underdeveloped country there are wide regional and rural/urban discrepancies in natural increase arising particularly as a result of local conditions, notably the localized occurrence of diseases and the availability of medical facilities, which brings us to the question of demographic transition.[27]

Michael Drake defines Population as "a flow of of persons through time." A population is therefore, a dynamic not static phenomenon and it is this particular characteristic of human population that poses special problems for the demographer trying to measure population change and even more so when he tries to predict its future behaviour.

Because populations are changing constantly and their structure affects the processes by which they change and therefore, in turn, these processes affect the structure of the population, the problems of measuring and ascertaining the nature of these interactions are very complex indeed.[28]

The first to draw attention to the problems of over population was Thomas Malthus, an English parson born in 1766, famous for his "Essay on the Principle of Population", published anonymously in 1798 and which ran into 5 editions from 1803 to 1826. These later editions were much more documented and closely argued than the original, which had been essentially theoretical and more in the nature of a pamphlet.

Malthus' essay was written as a reply to both the Enquiry Concerning Political Justice of Godwin (1793) and to

the "Esquisse d'un Tableau Historique des Progres de l'Esprit Humain" of Condorcet. Both these works overflowed with optimism about the future evolution of reason, science, technical knowledge and the population, which, according to Godwin, would be able to find within itself regulatory techniques to avoid overpopulation.

To the idyllic scenes evoked by the 2 authors, the rather sombre picture of England at the end of the 18th Century was a complete contrast. In the first place, the 18th Century had been marked by a considerable growth in population. The estimates of Gregory King give the population as 5 million in 1700, while the first census in 1801 gives 9.2 million. This increase in population was the result of a fall in the mortality rate coupled with a rise in the birth rate which was due to an increase in the number of marriages stimulated perhaps by the favourable conditions created at the beginning of the industrial revolution.

"It is a pretty depressing picture that Malthus painted and it is easy to see why, as a result of Malthus' theory, economics was referred to as a dismal science. We can summarize its essential propositions as follows ;-

1. A rising standard of living will increase population.
2. The growth in population will tend to be greater than the growth in food production.
3. The growth in population will only be limited when the standard of living falls to subsistence level.
4. Therefore any attempt to increase the standard of living will be self-defeating because the population will grow until the subsistence level is reached again."

According to Malthus, the population grows geometrically by doubling every 25 years. This is put forward as a possibility and the author found confirmation for his ideas in

the case of the American population which enjoyed particularly favourable conditions for expansion. In contrast, food production at best can only increase arithmetically every 25 years by a constant amount equal to that produced initially. Malthus does not substantiate this at all but it is not without some affinity to the famous law of diminishing returns."[29]

The term *"The Malthusian Dragon"* is a term often ascribed to the forecast of Malthus, wherein he states that population when unchecked tends to increase in a geometrical ratio (1, 2, 4, 8, 16, etc.) while subsistence (food) can increase only in an arithmetical ratio (1, 2, 3, 4, etc.) It was often referred to disparagingly by opponnents of Malthus who were of the opinion that he was unduly pessimistic.[30]

It was John Graunt who in 1662 in England published, what is a definite landmark in the field of demography, namely the Index and the Bills of Mortality and Malthus by his essay drew the attention to population studies. Before this, "Plato had recommended a static and precise demographic pattern for his ideal city. Confucius, in a China already a prey to overpopulation, favoured the idea of a quantitative equilibrium between the population and its environment. The taking of censuses or the passing of laws to prevent population decline, in ancient Rome is well-known."[31]

And, therefore the study of Population, though age-old is most significant today, in as much as it affects every country, rich or poor, east or west, for everywhere people who make up population are important.

It is an everchanging and dynamic picture, because it depends on people and their action, with regard to births, deaths or movement.

OVERPOPULATION
—ITS EFFECTS ON INDIA

For some millions of years, man's ancestors struggled to produce enough offspring to ensure that the species survived, and many early hominids did not. Matters were not greatly different in the early millenia of man's history and prehistory. However, during the last two or three generations the situation has totally changed, for in the technologically advanced human societies, virtually every female now survives to reproductive age. This is a biologically novel situation to which man's breeding habits have not been adjusted ; hence the human population explosion, which is the most striking and most important biological phenomenon of the 20th century. *Four great problems face man now and in the decades ahead, namely nuclear war, over population or the threat of it, pollution and resource depletion and the widening gap between the economic wealth of ihe rich and poor countries.*[1]

The Population Problem

By the term *population problem* is meant the problem that arises on several fronts due to rapid population growth. This growth is taking place in the world as a whole, but has more significance or repercussions in certain countries, especially the 'developing' countries.

Overall, the population problem has significance at two levels–the national and international level or *macro–level*, and on the level of the family–the *micro level.*

The world fertility level is presently about double the replacement level, meaning that each reproductive couple produces two more children than are needed to replace the parents.

Overpopulation exists when the population of a country is expanding faster than can its economy in the same time, thereby leading to inadequate support of its people. Over-population is considered to be the biggest problem of the 20th century, next only to that of world peace.

Rapid population growth in recent years has lead to a population explosion which indicates that population growth has outpaced economic growth which is increasing at a much slower rate ; for example in India, the population growth rate is 2.4% whereas the per capita income increase is only 2%. Overpopulation also signifies that a population explosion is occuring, a silent explosion but one in which the rapid outpacing or outgrowing of men to resources can "explode in suffering, explode in violence, explode in inhumanity" according to Robert McNamara's description of the term.[2]

There are differing viewpoints as to the urgency of the world population problem : some believe global catastrophe already threatens the human race.

"The evidence is all round us" observed Secretary General Kurt Waldheim in announcing the World Population

Year and Conference, "that each year, 127 million children are born; each year, 95 million come of school age and each year, 19 million reach the age of 65 years. These totals are likely to rise sharply in the years ahead as more young adults swell the ranks of potential parents and improved medical care advances the life expectancy. Each nation, each community, each family must assess in detail how these trends affect their hopes for higher living standards, a better education and greater health and happiness."[3]

The problem of overpopulation is not a simple one to describe, for the concept of overpopulation is a relational one. It depends on the idea that a given region must be considered overpopulated, if a disparity exists between the number of people in that region and the supply of a given resource. But such disparities have meaning only in terms of technico-economic and socio-political structures and ideals. This is readily shown when one examines the *three key resources* that have traditionally been used by most demographers to define overpopulation in a given area; these are **food, space and jobs**. Deficit in any one of these obviously depends as much on the life styles, technological capabilities, patterns of production and consumption as on population density — within a static framework that deploys a platonic notion–of fixed resources which can only be used to a limited extent and in a limited fashion, it is easy to establish that a region is intrinsically overpopulated or that it will rapidly become so.

The influence of social and technological presuppositions on the estimates of the number of people that could be supported by present-day agricultural technology is shown by the enormous variability in the estimates made by food and agricultural experts. As it is, in terms of the *food* criterion, the world has always been overpopulated, since at no time has there been enough food available for everyone. But this imbalance would be considered by most people to have been due to agricultural underdevelopment and maldistribution of food supplies, rather than to the intrinsic biological and physical constraints.

The *space* criterion for overpopulation is also based on societal assumptions, for those who prefer a nomadic pattern of life, the world must be considered to have been overpopulated for centuries ; for those who love large cities, the world must be considered to be underpopulated. As it is, if the present population of the world were to be situated in the USA then the population density of the USA would approximate that of England. A case of global overcrowding ?

In terms of *availability of jobs*, the majority of people would, I think, assert that scarcities in the employment market were far more likely to be due to inadequacies in the management of the central economy than to inadequacies in family planning policies.

Before I examine the question : *Is the world overpopulated ?* — I should like to comment on the criteria used by the Ehrlichs to define overpopulation. These exemplify the selective and partial way in which environmentalists often define key terms. The Ehrlichs state that : if an area is being supported by rapid consumption of non-renewable resources and if the activities of the population are leading to a degradation of the environment, then it must be considered to be overpopulated. By using these criteria, they merely have to point out that there is pollution and that non-renewable resources are being wasted to establish that the world is overpopulated.

It is true of course that something like one-third to one-half of mankind is undernourished. *But is this due to overpopulation* — that is, the inability of the world's food producing system to meet the demands made on it, *or is it due to a world politico-economic system that brings about the missuse and waste of food, the engendeering of artificial scarcities, agricultural underdevelopment and unequitable distribution of the food which is being produced ?* Surely the present state of malnutrition of large numbers of people in the Third World can hardly be ascribed to overpopulation when, for example, the

protein deficiency of Latin America could be totally made up by the USA refraining from taking the South American anchovy catch and converting it into cat food and feed for the chickens'

Consider how food surpluses accumulate in Western Europe and the USA to the extent that they constitute a financial problem. Not so long ago, it was costing the USA government 9×10^9 dollars a year to store surplus grain; and there was enough grain in the granaries to supply 200 calories a day for three years to the whole population of Asia.

Consider how Third World countries are forced to grow cash crops to earn foreign exchange; or how it profits third world land holding elites to substitute cash crops for food crops. In Brazil during the period 1952–60 the yield of cash crops like coffee increased by 87% while those of items like corn, rice, etc remained about static.

So my answer to the question "Is the world overpopulated" is "**No, It is underdeveloped.**"

The right question to ask about the future is not "How can the world resources support an infinitely growing population" but "How can we create the resources so that people of the world as a whole can create a meaningful productive economy answering to their own needs and purposes.[4]

McCormack also stresses that "The population problem is part of a much wider problem of dignified human development and stable family life; neither studies nor policies in relation to it can be separated from the broader context. Some groups do precisely this, stressing family planning with messianic fervour and with little attention to wider human needs and responsibilities. This imbalance leads to a concentration on quantitative policies aimed at restricting population and a neglect of positive and qualitative policies for housing, schools, jobs and family welfare.

It is essential to view the population issue in its integrated context. It is part and parcel of the development problem. It has relevance for nations but above all, for families. It is somewhat disturbing to encounter those specialists on development who can only discuss and recommend in terms of optimal growth rates. They tend to forget that nations consist of families and individuals. It is equally unrealistic to define the population problem as one solely concerning the marketing of birth control devices.[5]

The issue of population growth is often raised in connection with concern about environmental protection and the quality of life. What is the relevance of psychological studies in the population to the problems of urbanization pollution and general ecology ? The importance of these problems is beyond question and their current salience in the public mind is apparent, but the potential contributions of psychology are not easy to formulate. Only a few tentative considerations are offered.

First, there is the interaction amongst numbers, apetites and resources. Threats to the environment are posed not only by numbers of people but by numbers combined with habits of consumption, broadly defined. As has been pointed by Mayer (1909) t**the rich pose a greater threat than the poor** because they occupy more space, consume much more of each natural resource disturb the ecology more and create more land, air, water, chemical, thermal and radioactive pollution. Mayer argues that as disposable income increases, the population must decrease. Perhaps there is a role for psychology in studying the factors that produce an excessive appetite for goods and services in some strata and in some societies, and in analysing the psychological basis for man's exploitative view of nature. Are there means by which a psychological ceiling can be placed on consumption, apart from controls on income or production ? Can disposable income be channelled towards uses that are psychologically satisfying but not ecologically disruptive ? How can the overall picture of ecological imbalance be brought to the

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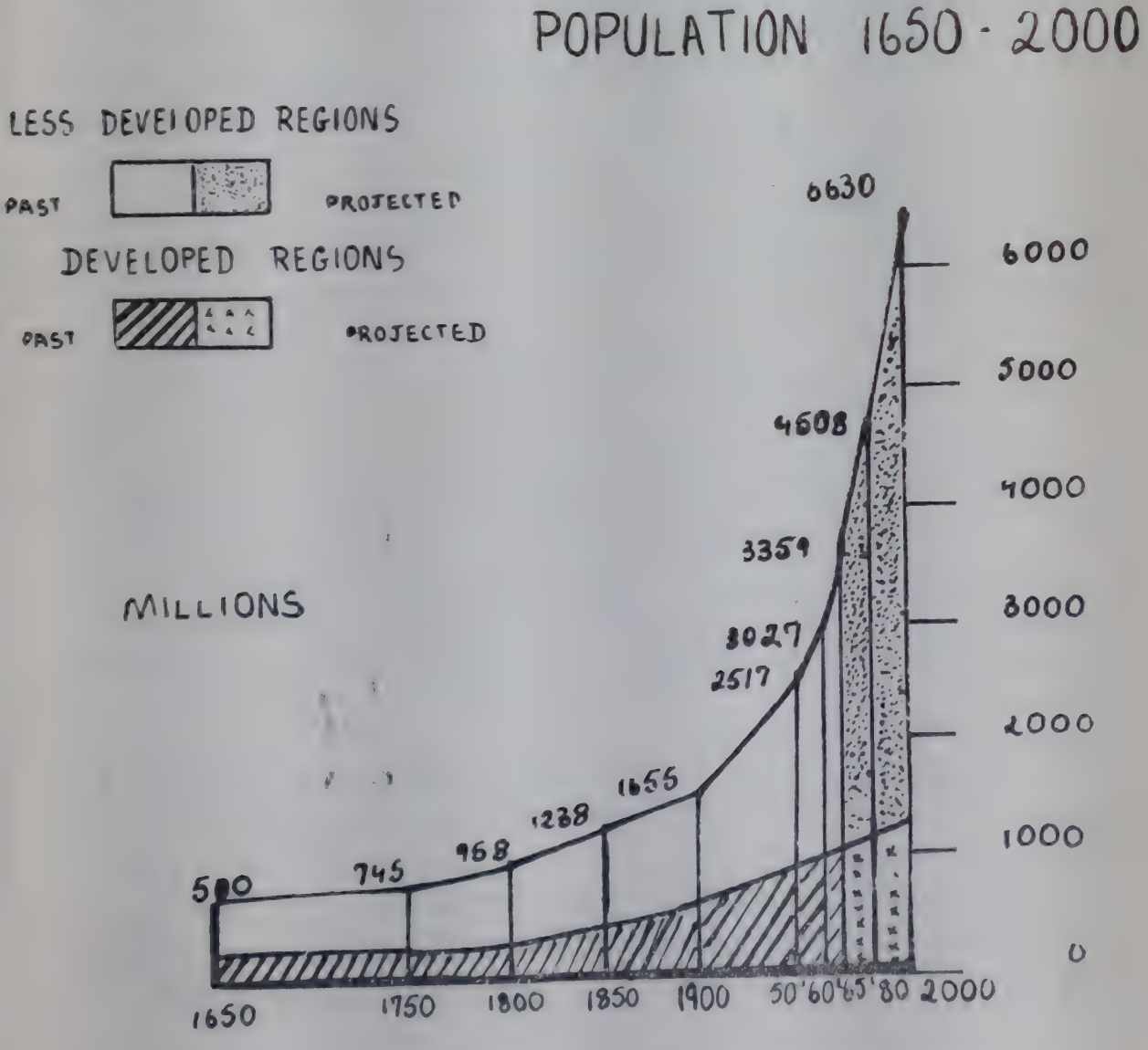
level of individual awareness and transformed into controls over individual actions ?[6]

Rates of Growth

Latest UN projections to the end of the century clearly illustrate the implications of the unprecedented growth in the world population brought about by reductions in mortality accompanied by little change in the high levels of fertility in developing regions. They demonstrate that world population trends for many years to come will be decisively guided by trends in the developing regions. The decade of the 1970's may be confronted with a higher rate of growth than has ever been experienced before in the history of man and one higher than is



likely to be encountered again in the future. According to the medium projections, the growth rate will be about 2 to 2.1% per year for the decade — from 1 to 1.1% in the developed regions and 2.4 to 2.5 in the less developed regions.

According to the projections representing the trends considered most plausible, the total world population may continue to grow at a virtually constant rate of about 2% annually until 1985. A downward trend would then start, ending at 1.7% at the end of the century. In absolute terms, the population may increase from nearly 4 billion in 1973 to 1.5 billion in 1980, 5.4 billion in 1990 and 6.5 billion in 2000. Even after fertility drops below replacement level of two children per couple, a population can continue to grow for upto 70 years, due to delays built into the age struture.

The population problem is not one but many problems, interweaving causes and effects, means and ends, as considerations of some of its chief features reveal. The growth of the world's population is proceeding on a scale and with a speed unprecedented in human history. One fourth of all the human beings born since the dawn of history are alive today.

At the current rate, there are about twice as many births as deaths each year in the world as a whole. The population boom is largely due to advances in public health and medicine which have suddenly and greatly reduced the proportion of early deaths among two thirds of humanity living in less developed countries. The reduction in mortality means not only that people are living longer but that infants and children now have a better chance than ever before of surviving to potential parenthood.[7]

"The basic problem of developing countries is that we have "westernized" them with regard to death rate but not with regard to the birth rate. At present, they have a high birth rate characteristic of agrarian economics and low death rates characteristic of industrialized economies. Medical science has been applied to the prevention of death but not of birth"[8]

The UN General Assembly, in the International Development Strategy for the Second Development Decade, has tacitly recommended an average annual population growth rate of no more than 2.5% in order to achieve the desired per capita annual income rise of 3.5%, but the rate of growth in many developing countries significantly exceeds 2.5%.[9]

It must be realized that the population problem in India, is of fairly recent origin in the sense that almost overnight a plunging death rate with a birth rate of slow decline is responsible for the rapid growth in population.

The health improvement that lowered mortality came about only gradually in the developed countries, proceeding at a slow pace until well into the second half of the 19th century. This of course held down the rate of population growth.

In the absence of opportunities for emmigration on a large scale which were already available to European countries, high fertility and a rapidly declining mortality in the modern developing countries add up to levels of population growth far in excess of those typical for the now advanced countries when they were beginning their economic growth.

The historical experience of the now developed nations is not necessarily a guide for the developing countries. New patterns of development may already be emerging and it may now be possible to bring about rapid economic growth much more quickly than in the past. The pattern of demographic change may also vary. In particular, decline in mortality in the developing countries may soon be followed by rapid decreases in fertility and reduced population growth rates to moderate or low levels.

If changes in reproductive behaviour leading to lower fertility can be effected along with basic social and economic changes (such as improvement in per capita income, literacy, education, health and the status of women), it can be expected

that in countries with an established programme aimed at controlling the rate of growth, the period of demographic transition will be shortened, thus improving the possibilities of economic progress.

Family planning programmes have not yet been proved to be instrumental in initiating a long term decline in fertility anywhere in the world. In developing countries where persistently high fertility was in existence, at the initiation of the F. P. programme, it is often found that 10-20% of the target population is actually receptive to the programme goals.

When the proper socio-economic circumstances for the decline in fertility are achieved, however, a F. P. programme is likely to contribute to significantly more rapid decline in fertility than would otherwise prevail.[10]

The problem of population explosion and hence the solution is an extremely complex one. It is not really one problem but a whole series of different problems. There are problems, for instance, arising from poverty, problems arising from wealth, from rising wants and expectations, from large populations, from small populations, from various social prejudices about the use of particular resources, from social and governmental controls of migration, from socially sanctioned attitudes to family size.....and so on.

It is important to stress the social side rather than purely biological or physical nature of many of the problems involved. In other words, the parameters are often not inevitably fixed factors or immutable biological forces but social factors...and social factors offer far more prospect of change through human effort. If, for example, the problem is population pressure, in the sense of some imbalance between population and resources, then there is the possibility of affecting either side of the equation: the social factors of various kinds that affect population size (in its various senses); and the social mechanisms and attitudes involved in exploiting or transferring resources.

Because of the social dimension of many of the problems involved, it is clear that possible solutions become much more practical than if, as is sometimes assumed, the population problem was some absolute and given fact of nature. The various problems may well be difficult to solve and their solutions may well involve difficult political choices – but being largely defined in terms of social factors, they are in principle susceptible to human choice and action.

Population pressure is not an absolute, but must be seen as a kind of balance between population size on the one hand and the resources available to it on the other.

Now it is obvious that resources vary both between and within countries. The sort of density, for instance, that would strain even basic food resources to the utmost in a peasant area dependant primarily on farmland, might be quite acceptable as far as food goes in a wealthy and technologically developed city. Again the resources available to 'developed' that is, wealthy nations in many respects greatly exceed those available in poorer nations with an immediate effect on the equation between population and resources and so on whether or not there is population pressure.

Even in the same country the balance between population and resources vary as in India — the crowded conditions of Calcutta form a contrast with the Northern Indian village of Andheri where there is still plenty of land to go around and the scarce resource is people to work it.

One cannot therefore generalize about population pressure, whether in developing or developed countries. This becomes even more obvious when one remembers that resources are not something given once and for all but comprise known and exploited resources.

The 'resources' side of the equation, therefore, is not immutable but is related to human ingenuity and

exploitation. In other words, resources are partly social and not merely geographical or biological facts.

The point comes out even more strongly when one remembers that the use of resources is not just a matter of needs. It is also a matter of wants. There are many cases where resources are available in thc physical sense but for various social reasons, people do not choose to exploit them : they are not socially available.[11]

In U. K. the growth rate is about 0.6% and the term population expansion can be used. It is interesting to note that in 1901 the population was 32.5 million and in 1966, 47.5 million ; yet in the age group 0 to 14, the population had barely changed at all during this time. The excess population is entirely concentrated in the adult age ranges and the greater the age considered, the greater proportionally has the population grown. Nevertheless the only means at our disposal for preventing the growth in population is in regulating the number of births. [12]

In a free society, the parents themselves must ultimately decide the size of their own family. We would regard it as an intolerable invasion of the family's rights for the state to use coercive measures to implement population policy. We can preserve that right best by assisting families to understand how they can make that final decision for themselves.

If we are to keep the right of decision in the hands of the family– where it clearly belongs- then we must give the family the knowledge and assistance it requires to exercise that right.

It is essential to remember that the population problem rests on the decisions of individual couples who finally decide thc birth rate. For these couples to accept measures to control family size or the number of children they want or need, one must first convince them and then provide them with the

belief and facilities in such a way that a smaller number of children truly benefit them as a family in all respects.

In rural India, the farmer needs help in the fields (in lieu of machines). His wife remembers, however, how many brothers and sisters she lost. Therefore, in order to ensure her husband with sons and thereby the family with a livelihood, however meagre, she must produce a large number of children.[13]

It is generally accepted that motivation for limiting family size often seems to be related to economic and social improvement in the society at large and in the family situation, awareness on the part of parents that they no longer need to produce a dozen of springs in order to see five grow up or a change in traditional views of desirable family size. If this is so, then the reduction of family size and a more controlled rate of growth would be spurred by technological, economic and social development.[14]

"Economics is all about how people make choices. Sociology is all about why they don't have any choices to make" (Duesenberry) : we have to create a situation whereby people in the Third World have a choice to make.

When considering the "Causes of the Population Explosion" one is confronted with a substantial number of causative factors. Some of the factors are more important in one part of the country or another, or in one social class than another or in one community than another. As India is in a period of transition or "ferment" there is bound to be a wide spectrum of factors and amongst them we can therefore consider the following causes of the population explosion.

Causes of the Population Explosion

1. Pronatality factors.
2. Desire for large family for economic security, social prestige and power.

3. Religious influences.
4. Social norms.
5. Polygamy.
6. Inadequate housing, poor socio-economic conditions
8. Security in joint family.
9. Social pressure for girls to marry.
10. Psychological urge for the married woman to have children.
11. Sex preference and equilibrium of sex of children.
12. Need for more hands for handicraft and agricultural activities.
13. Production of more children for providing against expected loss.
14. Production of more children to provide greater masculine virility/fertility
15. Little freedom for wives to decide the number of children.
16. Legal and religious recognition of the status of the male child for purposes of inheritance and family name.
17. Inducements for having more children, for example child allowance, tax exemption, maternity facilities, extra rations, etc.
18. Low legal age for marriage.
19. Regional/State/Racial/ethnic competition for political power.
20. High proportion of the population in the reproductive age group.
21. More man-power for defence needs.
22. Belief in the ability of agricultural technology and sciences being able to support larger population.
23. Remarriage of widows/Divorced women
24. Short period of breast feeding or no breast feeding at all (working mothers)

25. Anti-mortality factors
26. Health. Better maternal medical care , increased health facilities ; improved sanitation ; better diet ; greater control of diseases ; provision of recreational facilities ; benefit of maternity leave with full pay ; improved water supplies.
27. Education ; increased in and out of school educational facilities ; higher educational attainment ; health education programmes.
28. General improved Social Welfare Services; better housing; adequate clothing ; improved technology leading to more effective control of natural environments and catastrophes .[15]

Regarding the present day Pronatalism, it is convenient to start with the family since pronatalism finds its most obvious expression in this social institution. The pronatalism of the family has many manifestations, but among the most influential and universal are two :

—the standardization of both the male and the female sexual roles in terms of reproductive functions, obligations and activities.

— the standardization of the occupational role of women - half of the population in terms of child–bearing, child rearing and complementary activities. These two policies ensure that just about everyone will be propelled into reproductive unions and that half of the population will enter such unions as a career–a life's work. Each of these two policies is worth considering.

With regard to sex roles it is generally recognized that potential human variability is greater than is normally permitted within each sex category. Existing societies have tended to suppress and extinguish such variability and to standardize sexual roles in ways that imply that all normal persons will attain the status of parents.

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Individuals who by temperament, health or constitution do not fit the ideal sex-role pattern are nonetheless coerced into attempting to achieve it and many of them do achieve it, at least to the extent of having demographic impact by becoming parents. Therefore, a policy that sought out the ways in which coercion regarding sex-roles is at present manifesting itself, could find numerous avenues for relieving the coercion and for allowing life-styles different from marriage and parenthood to free and legitimatized expression.

In a society oriented around achievement and accomplishment, women who do not marry are exceptionally vulnerable to depression, frustration and a sense of futility because they are being blocked from a sense of fulfilment both at home and abroad.

If we wish to limit our growth, such a desire implies basic changes in the social organization of reproduction that will make non-marriage, childlessness and small (two-children) families far more prevalent than they are now.[16]

Not all countries have a population problem and especially those who view density per square kilometer as an index of overpopulation. Senegal's representative, declaring that Europe developed in the 19th century without birth control programmes, said "I am aware that the decrease in mortality rates today add a new dimension to the population problem, but technology has increased the industrial output. In Senegal it would be disastrous to limit population since the population density is of the order of only seven persons per square kilometer."

"Whatever the differences, there is wide agreement on certaim assumptions, that inevitably relate to population problems : that nations are more interdependent than ever before ; that the rich have an obligation to help the poor ; that no matter how many people the earth might eventually support, too many too soon can have and are having harmful effects ; that society should seek to improve the living standards

and quality of life of all people : that overcrowding, pollution, poverty, ignorance, disease, waste of resources and social alienation must be eliminated ; that the earth itself—fields and forests, lakes and seas—is now measurably affected by man's activities and must be protected against man's abuses in order to save mankind ; that children should be born into a family and a world that wants them ; that nations can and should help one another and combine their knowledge for the benefit of all"[17]

Consequences of Population Growth

On Economic Development

i) Land :—Smaller land holdings ; scattered land holdings ; uneconomical land holdings, decrease in cultivated land due to greater demand for buildings ; loss of natural fertility of land ; greater consumption of limited natural resources ; land holdings unsuitable for the use of modern technology ; low quality and quantity of the yield because of saturation point of intensive cultivation ; deforestation ; decrease in living space.

ii) Capital : Decline in per capita income ; neutralization of effort to raise per capita income ; less savings, slow formation of capital for further investment ; concentration of capital in fewer hands ; low tax paying ability of the people ; greater consumption of government capital for providing social services ; dependence on foreign aid.

iii) Labour : Increase in unemployment–underemployment due to increase of the people in the working age.

Ages are classified as follows :

Dependency age..... 0 to 14 years
Labour force.....15 to 64 years
Older group.....65 and over.

$$\text{Dependency Ratio} = \frac{\text{No. of young persons} + \text{No. of older persons}}{\text{Labour force}} \times 100$$

(per 100 persons)

Increase in unskilled labour ; Increase in the Dependency Ratio ; Increase in child labour (because of being cheaper and to supplement family income) Lower efficiency/ Quality of work ; Lower wages/cheap labour ; Reduction in the dignity of man/Labour ; Increased competition for jobs ; increase in frustration because of increased competition ; race for higher competencies/qualifications because of increased competition ; fewer jobs with good prospects for people of lower socio-economic strata : possibilities of labour unrest.

iv) Industry :—Proportionately fewer options for teaching modern technology ; greater dependence on foreign investment in industrialization ; need for industrial development for providing jobs to growing population ; increased pollution.

On Social Development

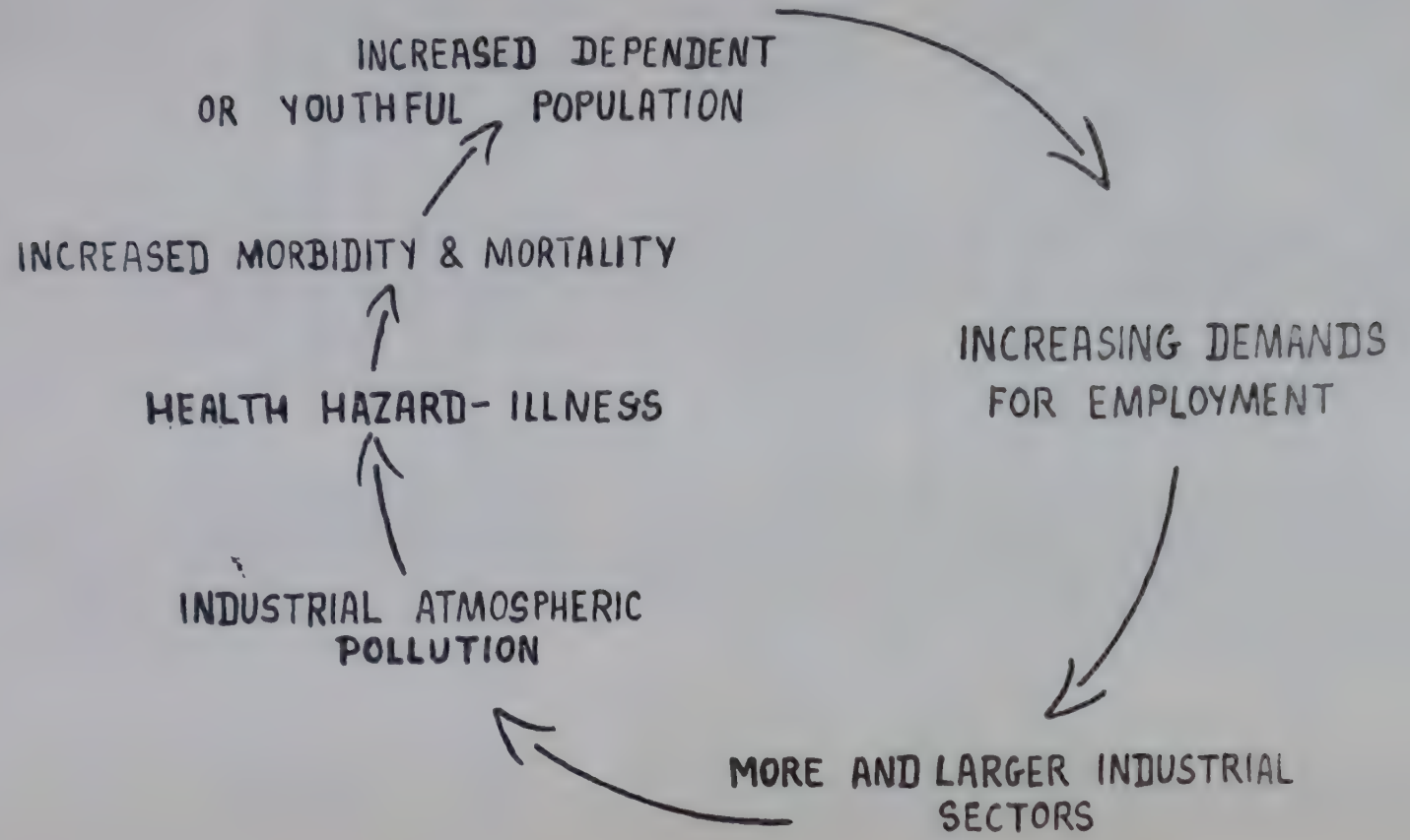
i) General effects :—Shortage of medical, educational, recreational, civic, transportational, communicational facilities : difficulties financing of various kinds of facilities.

ii) Education :—Lower quality of education ; higher pupil-teacher ratio ; remote chances of achieving universal literacy; overcrowding in classrooms.

iii) Transportation : Overcrowding in buses and trains. Increase in road and traffic hazards. Low ability to own transportation, communicational facilites.

iv) Social Relationships. Increase in Inter–regional and Inter-sectarian prejudices, and clashes of interests ; deterioration in Landlord — Tenant and Labour — Management relationships ; increase in strikes and riots ; juvenile delinquency. Social maladjustment, sibling jealousy.

Vicious Circle of Overpopulation and Pollution


INCREASED DEPENDENT OR YOUTHFUL POPULATION
INCREASED MORBIDITY & MORTALITY
HEALTH HAZARD- ILLNESS
INDUSTRIAL ATMOSPHERIC POLLUTION
MORE AND LARGER INDUSTRIAL SECTORS
INCREASING DEMANDS FOR EMPLOYMENT

On food

Mr. Borema, Director General of FAO noted that carry over stocks of wheat in the main exporting countries fell from 50m. tons in 1970–71 to less than 30 m. tons in 1972–73, their lowest level in 20 years. Similar depletions were reported in rice and other grains.

He called for development of the concept of minimum world food security. This envisions that all major consuming countries including developing countries should recognise a common responsibility, each according to its means, for ensuring adequate food supplies and should consult together as necessary to assess current and prospective national stock levels in relation to world food needs.

The growth in the less developed countries would require a 80% increase in food supplies by 1985 as compared with 1962, and this would not improve the quantity or quality of individual diets. With improved purchasing power, the demand would increase by another 40%.

This means an increase of food production of 3.9% a year is needed, as compared with the 2.7% a year achieved from 1955 to 1966. If the trend does not improve, the less developed countries will have to import $26 billion worth of food a year by 1985. For Asia, Middle East and North Africa, 90 million tons of food imports would be required or 100 million hectares would have to be diverted from other crops and livestocks to growing cereals.[19]

On Environment

Among the many ills that emanate from a burgeoning population growth-rates are stagnating levels of employment and wages, difficulties of housing, schooling and hygiene, dangers of pollution, disease and deformity, slum's

traffic congestion, social tensions and not the least a polluted environment.

Vast increases in population are rendering our air, water, beaches and fish less fit for breathing, drinking, swimming and eating. Wild animals are disappearing. The expansion in economic activity designed to feed a growing population is not only leading to all-round shortages but is also contributing to environmental crisis. An estimated 500,000 compounds are being emptied into the environment as waste products of man's economic activity. Many disintegrate quickly into harmless components but some like DDT, methylmercury and plastic containers are not biodegredable, and do not.

The net effect of increase of population on the global environment is that eco-catastrophes are occuring with increasing frequency. Diseases like emphysema (associated with air pollution) and schistosomiasis (carried by snails) are shortening life the world over.[20]

On Housing

The urban housing shortage was estimated at 9.3 million units in 1960/61, and 11.9 million units in 1969. The rural housing deficit in 1966 was estimated at 60 million units. To wipe out the 1966 rural deficit alone, over a period of 25 years, one would require construction of 24 m. units a year (at 5 persons per unit). In addition, between 1966 and 1976, rural population increase by itself will call for an average of 2.2 m units per year. In contrast to this need, less than 350,000 units per year were constructed over the period 1961-66.[21]

On Clothing

The following table gives the production of cloth in India and some selected countries in the world :

Production of cloth in India and in some selected countries

Countries	*Percapita production of cloth (metre)*
India	11.5
UAR	20.0
UK	36.0
USA	54.0
Japan	58.0

The table indicates that the people in other countries use from 3 to 6 times as much cloth per head as the people in India do. Although the Indian climate is such that people do not require more clothes, yet the fact is that the purchasing power of people is too low to buy adequate cloth. Moreover the production of cloth is not enough.

Cotton Cloth Production in India during the period 1950–1967
(million metres)

Year	*Mill sector*	*Decentralized*	*Total*
1950–51	3401	814	4215
1955–55	4665	1595	6260
1960–61	4649	2089	6738
1965–66	4401	3039	7444
1966–67	4202	3101	7304

The table indicates that the increase in cloth production in the mill sector has been very slow but the increase in the decentralized sector has been fast. As a result the per capita availability of cloth increased from about 11 metres in 1951 to about 15 metres in 1965. This compares very unfavourably with the figure of 58 metres in Japan or even with 20 metres in UAR in the year 1951. The production of cloth in the last two decades has considerably increased in these two countries and we lag far behind inspite of increased investment in this sector.

On Power

Electricity and water are essential facilities needed by people in any country. In India the total installed electric power generating capacity was as follows :

Year	*Capacity*	*Energy*
1960-61	56.5 lakh kw	2012 crore kw
1965-66	101.9 lakh kw	3682 crore kw
1968-69	143.0 lakh kw	5164 crore kw

The outlay on power development in the Third Plan in the public sector was Rs. 1252 crores and Rs. 82 crores in the private sector. In the Fourth Plan the total outlay is expected to be Rs. 2450 crores.

The energy is distributed to domestic, commercial, industrial, public lighting, traction. irrigation, water and sewage pumping and other sectors. There is a general demand for electrifying towns and villages. Inspite of massive investment in this sector much remains to be done. Big cities and towns with a population of more than 50.000 have been covered by 1970 but the need of more than 80% small towns and villages is yet to be met.

On Water Supply

The National Water Supply and Sanitation programme was launched in 1954. About 418.700 wells have been constructed since then, about 304.000 new hand operated tube wells bored and about 554.000 old wells renovated. But the increase in population during 1954–70 is so large that this modest achievement in wells does not satisfy the growing need.

On Transport

Railways : The progress made by railways and roads during the last two decades is as follows :

Year	*Railway route length*	*Rly. passengers*	*Goods*	*Road length*
1950-51	53596km	12840 lakhs	930 tonnes	157019km
1960-61	56247km	15940 lakhs	1562 tonnes	230883km
1969-70	59684km	23380 lakhs	2079 tonnes	325837km

It is apparent that the route length of the railways as well as surfaced roads has increased during the period 1950–70 ; so has the number of passengers. And yet we witness everyday congestion in railways and buses, long queues outside ticket sale windows and reservation offices and more rush for advance booking of goods. This helpless situation, inspite of steady growth in transport, has been brought about by rapid increase in our population.

On Comforts and Luxuries

The standard of living is not judged only by the amount of rice and wheat that the people consume but also, the comforts and luxuries that people enjoy. The comforts and luxuries include newspaper, radio, car and air-conditioned living and working space, etc. In India over 80% of the income is spent by people on food, clothing and housing for their families. Even then, most of the people are not able to have an adequate quantity of these goods and services. But in rich countries of Europe and North America, people spend about 50% of their income on their basic needs and save about 50% for comforts and luxuries. It is estimated that every second family in England owns a car ; every family in Australia owns a car ; every family owns more than two cars in USA ; but in India one in every 300 families owns a car. This is one of the indices of India's economic backwardness.

Use of some selected commodities of comforts and luxuries in some countries per 10,000 persons

Country	*Cars*	*Radios*	*Telephones*
USA	4140	14313	5431
England	1981	3176	2315
Japan	515	2547	1714
India	10	777	20

This table indicates that India stands at the bottom in the availalibity of comforts and luxury goods. This can therefore be taken as one more index of India's economic backwardness.

Production of comfort and luxury goods demand investment. As people spend over 80% on basic needs, they do not have enough to save. Due to lack of power to save, the growth of capital in our country is slow. This slow growth of capital is responsible for the industrial backwardness of the country.

Health

It has been stated earlier that the death rate is an index of people's health in a country. Although the death rate in India has declined since 1931 due to development of science and technology, yet the rate is high in comparison to other countries of the world.

Health depends largely on the food the people eat and the environment they live in. As already pointed out, average Indian food lacks in body building elements. Most people, therefore, have poor health and become an easy victim of disease. Cholera, malaria, influenza and tuberculosis cause death to a large number of people in our country. The death rate can be reduced by providing adequate medical facilities.

In 1969-70 the number of doctors, nurses and other categories of staff in hospitals was 10.900, 66.000 and 52.000 respectively. By the end of the Fourth plan period the country will have 137.930 doctors, 88.000 nurses and 70.000 other categories. But keeping in view the size of the country and the rate of growth of population, the medical facilities will continue to be inadequate. To provide adequate medical facilites to the people we have to increase the number of doctors, nurses, etc at a faster rate.

Availability of Medical facilities in some selected countries

A doctor in India has to attend to 4830 people which is 6 to 7 times higher than the number of patients in any country of Europe. Even in Asia, countries such as China, Japan, Phillipines, Turkey and Ceylon have better medical facilities.

If India wants to achieve the standard of any European country, she has to control the population growth as the number of doctors and nurses cannot be increased at a faster rate.

On Education

Only 29.34 percent persons are literate in our country. Literacy among males and females is 39.51% and 18.44% respectively. *About 82% of women in the country are thus illiterate.*

Since the Constitution provides for the education of children upto the age of 14, the Government has to make arrangements for 41% of the population in the 0-14 age group. Estimates indicate that during the last 15 years the number of institutions, students and teachers has gone up three times. But still the country has to provide additional facilities for the education of those who are not attending the schools and at the same time provision has to be made for the additional population of about 13 million being added year after year. Targets fixed

for the IV Five Year Plan and achievements in various stages of education are given below in the table. We have yet to go a long way off in achieving universal compulsory education in the age group 6-14 years.

TABLE : PUPILS IN SCHOOL : INDIA 1971 - 72.

	1950	*1960*	*1970*	*IV Plan Target*
1. Percentage of pupils in classes I - V to total population in 6-11 years.	42.6	62.4	77.5	85.3
2. Percentage of pupils in VI - VIII, to total population in age group 11 - 14.	12.7	22.5	33.1	41.3
3. Percentage of pupils in classes IX - XI/XII to total population in age groups 14 - 17.	5.3	10.8	20.3	24.2
4. Percentage of pupils at university stage to total population in age group 17 - 23.	0.8	1.8	3.0	3.8
5. No. of universities	27	45	75	—

On Employment

It has been mentioned earlier that about 50% of our population is in the working age group and has to maintain the rest 50% of the population which includes 41% upto the age of 14 and about 8% above the age of 55 years. As agriculture has been the main occupation of the people of India, it has not been possible to provide fruitful employment to all. Consequently, the country faces today the problem of increasing unemployment.

TABLE: UNEMPLOYMENT POSITION DURING PLAN PERIODS (IN MILLION)

Item	*Plan I*	*II*	*III*	*IV*
Unemployment in the beginning of	4.0	5.3	9.0	12.0
Unemployment at the end of	5.3	9.0	12.0	35.0 +
Jobs created during	N.A.	6.5	14.0	N.A.

N. A. Stands for Not Available. + Expected

This table indicates that unemployment has increased from 5.3 millions at the end of the First plan to 9 millions at the end of the Second plan, to 12 millions at the end of the Third plan. It is expected to go up to 35 millions by the end of 1974. The increase in unemployment is largely due to the rapid increase in population and slow rate of industrialization. The latter is due to shortage of capital and other necessary equipment. It is interesting to know that though millions of jobs were created during the plan periods. yet unemployment increased. This was primarily due to the addition of about 13 million persons per year during the last decade. If the country has to get rid of unemployment, it must provide 4 million additional jobs every year or reduce the growth of population considerably.

Per Capita Income

Per capita income is a good index of the material well being of the people of a country. Per capita income refers to the average income of the people in a country and can be calculated by dividing the total national income by the total population. The national income refers to the value of produced goods and services of a country during a year.

During 1969-70 there was an increase in both the national and per capita income. There was 233% increase in the national income during the decade but the per capita

income increased by 193% only. This was mainly due to the population growth in our country.

When we compare the per capita income of India with other countries we find that our per capita income is one of the lowest if not the lowest.

India stands nearly at the bottom in the world. The data also shows that the average income of an American is 30 times that of an Indian. Even the average income of a Japanese is more than seven times that of an Indian. The per capita income of many countries in Asia such as Ceylon, Thailand, Phillipines and Pakistan is more than that of India. We have to go a long way off in improving the economic condition of our country.

On Mineral Resources

The standard of living of a nation depends to a large extent on the economic development of the country, which in turn depends on the availability of natural resources including minerals. It is therefore necessary to examine the mineral position of the country.

Coal, Manganese, mica, iron ore are some of the important minerals found in India. Before Independence, our country was not industrialized and as such we could not utilize our minerals. After Independence, steps were taken to industrialize the country and the demand for minerals increased. For example, increased demand for machinery needed more iron and steel. The existing iron and steel works could not meet the growing demand. The Government therefore set up new iron and steel works at Bhilai, Durgapur, Rourkela and Bokaro. These plants demanded more and more iron ore and therefore production increased.

The production of almost all the minerals is increasing. Production of coal in 1964 was almost double that in 1951. In the case of iron ore, it is over 4 times ; however, we are consuming our minerals at a faster rate.

Coal :

It is estimated that the demand for coal during the Fourth Plan will be about 245 lakh tonnes of coking coal and 681 lakh tonnes of non coking and blendable coal. It is also estimated that the total coal capacity of the country is about 210.000 lakh tonnes. As the demand for coal is increasing and it is being consummed at a faster rate, the deposits will exhaust soon and there will be no more coal left after some decades. It is therefore desirable that this fluid should be used very carefully.

Iron :

The total reserves of all types of iron are placed at 21500 million tonnes. The average total production per year is 20 million tonnes. The deposits are therefore expected to serve for several centuries if the demand does not increase considerably.

Other Minerals :

The situatlon for other minerals such as aluminium, manganese, bauxite copper is like that of coal. The deposits are small and the consumption is increasing every year. The deposits may exhaust after some decades unless new deposits are discovered or demand reduced.[22]

However, the effects of overpopulation, though immense in extent and intense in depth, should not make us despair.

Realization is the first step to a possible solution. It will inevitably lead to action. Action at a macro level by

Government and international organisations ; but most important of all, action by individual couples on whom the final responsibility lies.

C. P. Snow has, however recently noted that it is the view of men of sober judgement that "many millions of people in the poor countries are going to starve to death before our eyes". "We shall see them doing so," he adds, in our television sets."

He stresses that when the collision between food and popnlation takes place, "at best this will mean local famines to begin with. At worst the local famines will spread into a sea of hunger. The usual date predicted for the local famines is 1975-80."

In summing up his own view, he suggests that "the major catastrophe will happen before the end of the century. We shall in the rich countries, be surrounded by a sea of famine involving hundreds of millions of human beings. The increase of population all over the rich world may get a little less. In the poor world it will not, except in one or two pockets. Despite local successes as in India, the food-population collision will duly occur. The attempts to prevent it or melliorate it will be too feeble. Famine will take charge in many countries. It may become, by the end of the period, endemic famine. There will be desperation and suffering on a scale as yet unknown."

McNamara feels that "wholehearted famine is not inevitable." I am convinced that there is time to reverse the situation, if we will but use it. Only barely sufficient time–but time, nevertheless.

It is the time which has been given us by those who have created the revolution in agricultural technology : a revolution based on new seeds, hybrid strains, fertilizers and the intensified use of natural resources.

It is a revolution which already has increased the yields of food grains by more than 100% in parts of S. E. Asia and which promises to boost yields by one-half ton per acre throughout Asia. It is a revolution which has expanded the number of acres sown with the new seeds, from 200 in 1965 to 20.000.000 in 1968 and an estimated 34.000.000 in 1969-but which has yet to touch more than a small percentage of the rice and wheat producing acreage of the world.

If we will but speed the spread of this agricultural revolution- by adequate and properly administered technical and financial assistance to the developing countries-we can expect that for the next two decades the world's food supply will grow at a faster rate than its population. The predicted spectre of famine can be averted.

It will take immense energy and organising skill and significant infusions of new capital investment-but it is possible to stave of disaster.

What is required to accomplish this is not so much a psychologically comforting optimism as a energetic, creative realism.[23]

POPULATION AND URBANIZATION

Urbanization

" Urbanization is the *process of transition* or the *position on a* continuum *from a rural to an urban social psychological condition*, eg. from few, permanent, primary social contacts to many, impermanent, secondary social contacts. Or again, urbanization has been defined as " a complex of social, ecological, and cultural trends which produce positive developments in any or all of the following four aspects: a dominance of commercial, industrial and service occupations; an extensive division of labour and its corresponding social complexity, and accompanying and underlying high density of population and the development of coordination and social controls on a non-kinship basis.[1] "

"The human species is remarkable in its wild geographical range and there are few areas of the earth's surface which are not permanently inhabited by at least some people. Few other species among mammals can match this extensive distribution and many of those that do, owe their range directly or indirectly to that of man.

It seems very likely that migration and other forms of movement have been one of the main factors maintaining the integrity of the human species in its wide geographical range. Gene flow, which occurs only through some form of movement, is the great homogenizing influence in evolution. *A Mendelian population has been defined by Dobzhansky as "a reproductive community of individuals who share in a common gene pool."*

In recent times, with rapid population growth and advancing technology, especially in industrial societies people have become more or less distributed over quite considerable areas. Small clusters have expanded and coalesced, and though the resulting connurbations still tend to be separated from one another by relatively uninhabited space, they have generated a different type of genetic structure within themselves.

It may also be convenient to distinguish between long-range movement and short-range movement, though the distinction is clearly one of degree and again, it is possible for both to occur at more or less the same time. Long-range movement is, however, of special concern in considering the broad evolutionary prospectus of a species, whilst short-range movement is of paramount importance in determining local genetic structure and differentiation.

Long-range movement can itself occur either by the migration of a group of people during their own lifetime over some considerable distance or by the continual movement of a population through many generations over an equivalent distance.

Overall, the evidence suggests that long-range movement in one form or another has been a widespread phenomenon throughout the later phases of human evolution.

Short-range movement. This is broadly dictated by routine daily activity patterns. Those aspects which are here of main concern, because of their genetic complication, are the movement of individuals which directly or indirectly lead to the choice of a mate, and the subsequent movement of pairs which determines into which population the offspring are introduced. Since children are usually born within some form of "wedlock" the former can conveniently be referred to as marital movement of parent-offspring movement - the matter of critical genetic concern, post - marital movement, being the other. Marital movement can be thought of as having four possible components - magnitude, distance, orientation and direction."

Increasingly occurring urbanization, proportionately increases the mobility of people.

"There are several streams of mobility or migration which co-exist in modern urban areas These are grouped by Boskoff as follows :

1. *Intracity Migration :* Changes of residence within municipal limits in a given time period.
2. *Intrametropolitan Migration :* changes from central area to a suburb or fringe area or vice versa.
3. *Interurban Migration :* migration between central areas of urban areas.
4. *Intermetropolitan Migration* : movements to surburban fringe areas of different urban regions.
5. *Rural - Urban Migration :* Movements from farms to urban areas.
6. *Rural – metropolitan Migration:* movements from farms to urban areas.[2]

Rural Push Factors

The term "Urbanization" is used here to refer to this new kind of migration : not the movement of people who, either peacefully or through conquest, extend a fairly homogeneous culture over a wider geographical area, but rather the *movement of people away from a traditional culture into a modern culture*, with no intention of setting up a copy of the old ways.

Even in the past, however, migrants did not always succeed in creating copies of the parent culture, even though that may have been their intention. Urbanization is different in that migrants do not attempt to establish societies modelled after the known parent culture ; they attempt rather to adapt to an exisiting culture that they perceive as being "better".

In this sense, urbanization does not necessarily refer to migration to cities, but rather migration to a different style of life.

Urbanization is universal. On a world scale, the increase of urban population is much greater than total population growth.

Urbanizaton may be the result of population pressure in areas where traditional ways of life do not allow intensification of the use of environment necessary to accomodate an increased population ; people may feel pushed away. Or, perhaps, *people feel pulled to the attractions of "the city"*. Whether pushed or pulled, however, there is a sense of wanting to (or having to) change one's pattern of life.

Urbanization is one aspect of the whole complex pattern of social change now surging across the earth. It is a movement that follows changed perception and needs and also causes changes in individual and communal lifestyle, for those who move as well as for those who stay. Since it is often young people with the most initiative who move away, the capacity of

the parent community to adapt to new circumstances is further reduced.

Urbanization impoverishes the parent culture. It is not an expansion but a reduction.[3]

Urban migration therefore consists of two aspects; the population characteristics of incoming migrant categories ; and the character of migrant patterns among existing urban populations. In short, migration and mobility are distinguishable into *urban-building and urban—dispersion types.*

In early stages of urban growth, rural-urban migration is most important. This type of migration seems to attract relatively young, single (or married, but migrating without family) persons with limited skills and education. Some inter-urban migration also occurs during this period, this usually consists of family units with young children.

Economic and social factors have motivated rural-urban migration in the past and they continue to motivate it now.

The industrial revolution of the 19th Century in Europe and North America proceeded at a relatively moderate pace. In the developing countries by contrast, there appears to be a headlong rush to the capitals and cities and these appear to be already over-urbanised, meaning that their industry and related activities cannot employ all men and women who migrate to their urban areas. Economic and social problems and problems of administration and Government multiply in these countries as masses of uprooted rural people, unskilled and uneducated, converge on the capitals and other metropolises.[4]

"In Britain population growth was maximum when the country was already industrialized and urbanized with only a fifth of its males in agriculture. Now the *non-industrial countries are 29% urbanised* and have only *15.1% of their people*

in manufacturing compared to figures of 38.5% and *27.9% respectively for the industrial countries in the 19 Century,.*"[5]

As countries become more urbanized the population becomes highly mobile. Because of fundamental economic and social changes associated with modernization, such as automation of industry, mechanization of agriculture, the remaining rural people and those living in stagnating smaller urban areas moved to larger urban areas or they shift from one large urban area to another. As conditions deteriorate, industries, businesses and higher-income families move to new surburban communities in search of a more congenial environment ; and the labouring migrant and newcomer take over the decaying central areas abandoned by the more affluent citizens. Open spaces are being consumed at a terrifying rate so that the surburbs once in open country are now surrounded. Travel time within the urban area has multiplied as the roads and highways get clogged during the rush-hours.

Thirty seven people out of every hundred in the world live in an urban area. The way of life found in the modern city is an essentially impersonal secondary and contractual way of life, associated in its extreme form as anonymity to transient contact. In India, though the joint family system mentality is preserved to some extent within families of related migrants.

Problems of Urbanism in General

The handicaps of newcomers to urban life are manifold. According to Weaver, five stand out, however, and are prevalent in general :

1. Misinformation about job opportunities and cost of living.
2. Abrupt severance of ties with the home community.
3. Ignorance of institutions of the new urban community.

4. Impediments to communications with urban people.

5. Educational deficiences which in urban occupations and life represent insurmountable handicaps.

With these handicaps the newcomer to the urban area rarely finds employment sufficient to improve his condition. In fact, he may shift from rural subsistence to an urban life below the humblest concept of human decency having to live in the slums or over-crowded parts of the urban area.[6]

Economically active children aged 7–15 in India have been reported to constitute some 11% of the rural and more than 50% of the urban labour force.[6a]

In rural areas religious beliefs and practice determine most events.

Though urbanization is not basically anti-religious, the pressures of urban life do not facilitate religious rituals. "It may well be that for the modern urbanite, new forms of religious expression (not yet achieved or created) are needed to provide necessary spiritual support on his present socio-cultural level.

Also, there is in urbanization a growing dominance of economic and technological values (profit, income, efficiency) in organizing and disorganizing clusters of social relationships in the community.

The *social problems* of urbanism, defined by Boskoff as "repeated and relatively wide-spread human situations which are in some manner recognized as undesirable and as requiring drastic modification," may be classified in the following way :

1. Urban congestion and uncontrolled competition in urban space.

2. Personal inadequacy and insecurity.

3. The costs and dilemmas provoked by continual striving for status.

4. The absence of communal cohesion or morality, especially in crisis periods.

5. The failure to promote orderly physical and social developments for the urban area as a whole."

Our urban areas today continually exhibit contradictory aspects. The catalytic presence of cultural heterogeneity seems to be partially negated by growing uniformities in taste, consumption and ideas. Creativity in various fields, a hallmark of urbanism, is accompanied by considerable apathy and a taste for the safely familiar. *Despite the variety of activities, vitality and fascination of city living, there is likewise boredom and countless indecision about the use of leisure time.* If there is expanded productivity - in comforts and conveniences, as well as necessities poor or dubious health and physical ills are also quite apparent to the urbanite Finally the relatively wide opportunities for personal and vivacious achievement share the urban stage with keen feelings of aimlessness, frustrations and despair.

Some of the ameliorating effects of urban adaptation in human beings are suggested by the death rates from lung cancer in the United States. When controlled for the degree of cigarette smoking, these death rates are considerably higher in farm-born people who have migrated to cities than in life-long city dewellers.[8]

The increased susceptibility of rural people in India to tuberculosis (T.B.) due to the sudden exposure to formerly higher urban incidence of T.B. is another effect of urbanization.

Migration

Migration can broadly be classified into *International/Internal*. International migration involves crossing of national boundaries and is dramatic as it involves the crossing of formidable cultural and political barriers.

Internal migration is less dramatic and signifies the movement of population within a political circle which may have the same sociocultural proximities. It constitutes all changes of residence within the national territory and as such involves not only the change of population between the communities but also within the communities.

Internal migration fulfils the theoretical functions and tasks of migration, viz. the equalisation of "population-opportunity" balance. It is thus a great economic leveller.

Migration also involves a break in community, social or linguistic ties especially international migration.

In contemporary India, especially during the last twenty years, with the growth of industries, commerce and trade, gaps between the rural and the urban sectors in respect of employment opportunities and wages have considerably widened, with the result that urban complexies are expanding at the cost of rural depopulation. The field of migration in India has not been explored as extensively as certain other similar demographic phenomena.

Many of the other ancient civilisations, such as Greek, Roman and Chinese, have to contend with hard winters without any escape. India on the other hand, was blessed by a bounteous nature who demanded little of man in return for sustenance, but in her terrible rage could not be appeased by any human efforts. Hence it has been suggested that the Indian character has inbibed in itself a sense of fatalism, quietism, and an attitude of embracing fortune and misfortune alike without

complaint or grudge. With characteristic contentment, the Indian nation has never attempted to spread itself over the surface of the globe in pursuit of a livelihood.

However, in modern times, a little movement across the Indian boundaries has been witnessed. Emigration of Indians to British colonies was encouraged by the British in India for development of agriculture and farming in the new settlements.

Much more important than this was the immigration of the Hindu refugees from Pakistan. This was a forced migration and the demographic importance had been far less than the political importance. There was also some emigration of Muslem families from India to Pakistan. In between these two epochs, the permanent repatriation of many Indians settled and born in Burma, during the World War II deserves a place in the balance sheet of the country's population movement. Finally with the growing ease of travel and communication, the desire for the advancement of educational and technical knowledge and the realisation of the necessity of cultural inter-changes, there developed almost in every country a smaller international community.

Unfortunately, the statistics on past immigration in India are not very reliable, and in as much as the statistics are inadequate and the coverage fragmentary, they cannot give accurate knowledge of immigration except some hazy notions about the size and direction.

According to the results of 1961 census of India, of the total 439 million population roughly 429 million were born in India. In 1951 there were about 8.7 million persons living in India who were born outside the country; roughly 2.4% of the total population. In 1947 India was partitioned. However if the population enumeration as born in Pakistan is dropped from the calculation in the last two censuses the proportion of foreign-born in India in 1951 and 1961 was roughly 0.12% and 0.17 respectively.

INDIAN POPULATION CLASSIFIED BY PLACE OF BIRTH AND PLACE-OF-ENUMERATION : 1961

Country/State of Birth	*Rural/Urban Classification*	*Persons by place of Birth*	*Persons by Place of Enumeration*	
			Rural	*Urban*
A. In India	Rural	369,345,736	349,665,939	19,679,797
	Urban	59,204,976	4,815,126	54,389,850
I. State of Enumeration	Rural	359,127,417	344,330,178	14,797,239
	Urban	54,940,805	4,162,757	14,797,239
(a) in place of enumeration	Rnral	250,565,609	250,565,609	—
	Urban	43,570,853	—	43,570,853
(b) elsewhere in district of enumeration	Rural	85,741,328	77,520,837	8,220,491
	Urban	5,415,124	2,652,256	2,762,868
(c) in other districts of the State	Rural	22,820,480	16,243,732	6,576,748
	Urban	5,954,828	1,510,501	4,444,327
II. In Indian beyond the State of Eunmeration	Rural	10,218,319	5,335,761	4,882,558
	Urban	4,264,171	625,369	3,611,802
B. In Countries of Asia beyond India incluuding U.S.S.R.		8,995,932	4,474,105	4,521,827
Pakistan		8,308,425	4,021,615	4,286,810
C. In Countries of Europe Excluding U.S.S.R.		26,577	3,774	22,803
D. In Countries of Africa		34,473	13,497	20,976
E. In Countries of two Americas		5,833	996	4,837
F. In Countries of Oceania		1,407	531	876
G. Born at Sea		28	15	13
H. Unclassifiable		401,537	344,601	56,936
Total Population		438,936,918	360,000,315	78,936,603

Source : Extracted from Table D—II. Place of Birth. *Gensus of India* 1961. Vol. I. No. 1. Idia Part I—C (iii) *Migration Tables*, p. 16. The Unclassifiable category which for all India accounted for a total of 920,419 has been left out in the table,

STREAMS OF INTER-STATE MIGRATION

HEAVY STREAMS OF MIGRATION BETWEEN STATES, INDIA : 1961

Sl. No.	*From*	*To*	*Number of Migrants*
1	2	3	4
1.	Andhra Pradesh	Maharashtra	284,000
		Tamil Nadu (Madras)	125,400
		Mysore	290,600
		Orisa	53,000
2.	Bihar	Assam	257,000
		Madhya Pradesh	57,500
		Orissa	95,300
		Uttar Pradesh	227,000
		West Bengal	1,349,000
3.	Gujerat	Maharashtra	573,000
4.	Kerala	Maharashtra	97,9000
		Mysore	137,000
		Tamil Nadu (Madras)	276,300
5.	Madhya Pradesh	Maharashtra	239,000
		Orissa	56,000
		Rajasthan	128'000
		Uttar Pradesh	223,000
6.	Madras (Tamil Nadu)	Andhra Pradesh	171,600
		Kerala	191,600
		Maharashtra	120,900
		Mysore	395,200
7.	Maharashtra	Andhra Pradesh	98,580
		Gujarat	185,800
		Madhya Pradesh	300,200
		Mysore	168,900

1	2	3	4
8.	Mysore	Andhra Pradesh	183,000
		Maharashtra	467,500
		Tamil Nadu (Madras)	88,600
9.	Orissa	Assam	51,000
		Bihar	60,500
		Madhya Pradesh	114,900
		West Bengal	187,000
10.	Punjab	Madhya Pradesh	66,300
		Maharashtra	64,300
		Rajasthan	295,100
		Uttar Pradesh	322,200
		West Bengal	53,7000
		Delhi	339,200
11.	Rajasthan	Gujerat	151,500
		Madhya Pradesh	280,300
		Maharashtra	116,700
		Punjab	203,900
		Uttar Pradesh	124,000
		West Bengal	63,800
		Delhi	94,500
12.	Uttar Pradesh	Bihar	303,100
		Gujarat	83,300
		Madhya Pradesh	478,500
		Maharashtra	420,700
		Punjab	286,600
		Rajasthan	144,900
		West Bengal	346,900
		Delhi	419,9000
13.	West Bengal	Assam	54,800
		Bihar	308,100
		Orissa	72,600
		Uttar Pradesh	60,100
14.	Delhi	Punjab	69,400
		Uttar Pradesh	57,8000

Heavy Streams of Inter-State Migration

If only the heavy streams are accounted, cut point being 50,000, the picture of Indian population movement would be easier to grasp. Most of the movement of population is confined over the bordering states.

The statistical data does indicate that there are certain well-defined drifts of population movement. These are given as follows :

1. One chain of drift is from *Kerala to Madras ; Madras to Andhra Pradesh : Andhra Pradesh to Mysore ; Mysore to Maharashtra* and finally from *Maharashtra to Madhya Pradesh.* This shows that in South India there is *drift from south to north.* The drift culminates in Madhya Pradesh.

2. The other notable drift is from Uttar Pradesh and Rajasthan to Madhya Pradesh and from Madhya Pradesh to Maharashtra. Thus between Madhya Pradesh and Maharashtra the movement is both ways.

3. The third important line of movement is a two-way drift from *Bihar to Wesi Bengal and West Bengal to Bihar :* the latter being not as heavy as the former. From Orissa a drift can also be seen to West Bengal.

4. Between *Punjab and Delhi* there is some reciprocal migration. Similarly there is a little movement across the boundary from Gujarat to Maharashtra. The analysis thus provides that Maharashtra and Madhya Pradesh, are the main centres of attraction beside West Bengal.[12]

The impact of population growth is on economic development, on housing and health, education and welfare services, transportation, in urban and industrial areas.

Urbanization and industrialization actually bring down the birth rate. Therefore the actual population growth in cities should be less compared with growth in rural areas. But according to current estimation, the urban growth of population in India is 2.7 per cent per annum compared to 2.1 per cent in rural areas.

The Indian City

The actual growth in cities is the result of two factors–*natural population growth in cities which is only 1.9 per cent* plus the difference of *1.8 per cent brought about by annual migration of people to cities from rural areas.* Here the large cities have the greatest pull on migrants either from small cities or rural areas. *India had in 1971 nine large cities* with a population of *one million or more*, and *2,641 urban units* with a population of *2,500 or more.* 19.9 per cent of India's 548 million people are concentrated in these urban centres. And of this urban population more than half the total (56 per cent) is concentrated in the large cities of one lakh and over. Compared to the rural population, those who migrate to cities are better qualified, more disposed to take risks and disproportionately single.

Slum Dwellers

Regarding housing problems, the shortage in Indian urban areas was estimated at 9.3 million units in 1960 and over 12 million in 1970. Indian city dwellers live under conditions of greater population density than those found even in the great industrial centres of the West. According to the 1971 Census, Calcutta has a density of 30,276, Madras 19,293, Ahmedabad 17,053, Bombay 13,640, and Bangalore 11,462. But certain sections of these cities have densities of population exceeding a hundred thousand and going even up to 500,000 per square mile which is unheard of in any city in Europe or the USA.

Overcrowded cities create a phenomenon of sprawling slums. One should not look upon slums as a symbol of despair but as a sign of hope, first as an advance from homelessness into shelter and then as a passing stage to something better. An unskilled worker without money starts as a street sleeper. In Calcutta alone, it is estimated, that over 6 lakhs of people sleep on pavements and in Bombay one out of every 60 persons is homeless and several thousands live under stairways, in cattlesheds, or similar spaces.[13]

"Energy Flow and Biochemical Cycles in an Urban Community"

1. The subject is of overwhelming significance in relation to the problems of man in the urban world, but receives little attention.

2. The important developments in urban ecology (in the biological or metabolic sense of the term) are intimately connected with population changes, including rural–urban migration and the over-all increase in population. In other words, physiochemical and energetic aspects of the total urban situation should not be considered as separate and distinct from the changes in the numbers of human organisms and their state of health.

3. In the long run ecological consequences of the growth of cities may well have far-reaching and possibly devastating effects on human populations. The city is not, of course, an 'ecosystem' in the usual sense of the term, in that it is not self-supporting. No appreciable photosynthesis occurs within the urban area and it depends entirely for its supply of energy and chemical compounds upon ecosystems and resources beyond its walls. In fact, although we must be wary of the 'organic analog' approach, the city is, from the ecological viewpoint, much more like a gigantic, immobile animal, than it is like an ecosystem.

Chemical cycles

The *resemblance of the city to a collosal animal lies in its consumption* of *oxygen, water, and organic matter (in the form of fossil fuels and food substances) and its release into the atmosphere of carbon dioxide and water vapour*, and its excretion into the surroundings of organic waste material suspended or disolved in large volumes of water. However, it differs from an animal in one particularly important respect, namely, many of its products are quite unlike the products of any biological organism. The metabolism of the city involves the re-arrangement of elements to form not only such biologically novel substances as various metal alloys, concrete, and so on, but, more importantly, a vast array of synthetic compounds, many of which, although alien to the biosphere, are nevertheless very potent biologically and therefore likely to cause disturbances in organism and ecosystems with which they may come in contact. Other products like plastics and 'hard' detergents are almost undegradable by biological processes. It has been estimated that some half a million different chemical substances, products of the metabolism of cities, are released daily into the environment, most of them finding their way eventually into the ocean (Geiling and D'Aguanno 1960, Goldberg 1969).

The sheer scale of activity of modern cities is causing significant changes in the environmental concentration of more 'natural' substances. An increase of 25% in the carbon dioxide content of the total atmosphere of the earth is anticipated by the year A. D. 2000 (Tukey 1965) and the increasing turbidity of the atmosphere is causing considerable concern among ecologists.

It does not require much imagination to appreciate that, in view of the quantities involved and the special nature of some of the products, the recent introduction into the biosphere of large and increasing numbers of urban units with these metabolic characteristics is a development of considerable ecological significance.

Energy flow through industrial society

The energy required to maintain the dynamic metabolic processes of the city is at present supplied almost entirely in the form of chemical energy originally trapped from sunlight by plants through photosynthesis ; the contribution of the hydro-power and nuclear power is at present negligible. Thus, energy enters the' system in the form of potential chemical energy in fossil fuels and organic matter and it leaves it mainly as heat.

I have not estimated the actual flow of energy through our hypothetical city of one million people, but will refer instead to the figures for the energy utilized by the present population as a whole. The total amount of energy used by human society and derived from coal, petroleum, natural gas, and electricity in 1966 is (given in the United Nations Statistical Yearbook of 1967 as) the equivalent of 5505x 10^6 metric tons of coal. We must add to this energy provided by pack animals, fuel wood, utilization of wind, and so on, which is estimated to be in the order of 500 x 10^6 metric tons of coal (Woytinsky and Woytinsky 1953).

If we convert the sum of these two figures into kilocalories and add to it the energy flow through the individual human organisms (ie. about 3.6 x 10^{15} kilocalories per year), we arrive at a total figure of about 4.5 x 10^{16} kilocalories for the year 1966. The present figure (1970) can be expected to exceed this by at least 10%, giving us a value of nearly 5.0 x 10^{16} kilocalorles.

It is revealing to compare this figure with estimates that have been made on the total amount of energy captured from sunlight by photosynthesis. One such estimate, sited by Kermondy (1969) is as follows : 4.3–6.3 x 10^{16} kilocalories. per year

Photosynthesis by oceanic vegetation
$4.3–11.8 \times 10^{16}$ kilocalories per year.

It is apparent, therefore that a single species, homo sapiens, now utilizes in its daily activities about as much energy as is fixed by the whole of terrestrial vegetation in the same period of time. Since it is confidently and hopefully predicted by engineers that the rate of energy utilization by mankind will increase some 4 to 5-fold in the next thirty years, it is clear that before long the energy flow through urban-industrial networks will exceed the total energy consumption by all animals and plants on land and in the sea put together.[13a]

Health Services

How does urban over-population affect health services ? "In spite of the fact that cheap public health techniques like malaria eradication and water purification has brought about a rapid decline in mortality since the Second World War in the developing part of Asia, the level of health services per capita remains very low". Citing statistics, in countries with high fertility rate there are only 19 physicians and 68 hospital beds per 1000 population, while the ratio of physicians and hospital beds is 110 and 1,144 in Japan and 163 and 1,173 in Western Europe. Added to this there is a continuous drain of doctors who go to Western countries and settle down there.[14]

Urban Planning as a Process for social change

Social problems (Young 1968) "often arise out of competing and conflicting interests and values between diverse groups and social institutions ; out of the failure of groups and institutions to respond to the demands of changing conditions; out of their inability to fit themselves into the larger community ; and out of their inability to inact and impose effective social controls." Social problems thus seem to arise and persist under two sets of conditions :

a) Complex and gradually rapid processes of change : and
b) Lack of experience and/or unwillingness to intervene in intelligent, systematic manner.

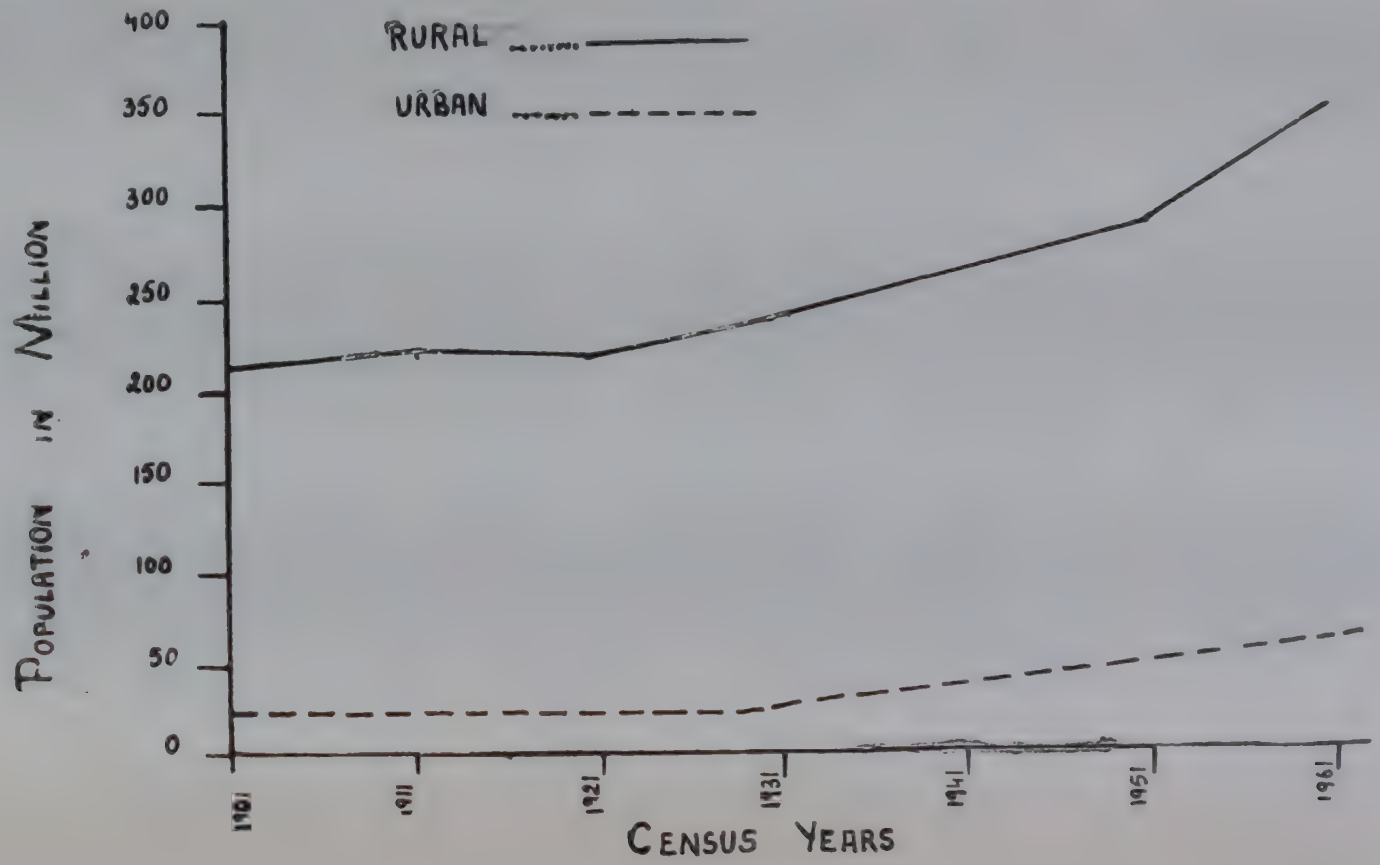
Essentially, the rationale of urban planning is its potential role in bridging the gap-as effectively as possible-between adjacent stages of the urban change process. The theory of planning therefore rests on the continuing knowledge of human capabilities and desires, and of altered or improved techniques and facilities for meeting these desires. The ultimate objectives of planning strategy is therefore a gradual re-orientation of traditional values (ie. cultural change) to enable urbanites to reap the objective benefits of social change with minimal disturbance to their security.

Urbanization should be planned with urban areas spread over the whole country, thus bringing urbanization to the rural people.

"In the transition to industrialization and urbanization (a period of many social changes), it is conceivable that the fertility level could fall but, in fact, it almost always rises. It did so in England at the outset of the industrial revolution and led to a "distegration" of village society. The proximate causes were a higher incidence of illegitimacy, a lowering of age at marriage, a higher overall marriage rate, and less frequent or less effective control of conception within marriage. Japan's experience was similar (Peterson 1969).

The same may also be the case of India. Baker showed that women in joint families have a lower fertility level than those in simple families and the social changes due to urbanization are causing a decline in the number of joint families and seem to have led to an increase in marital fertility. (Agarwal 1970, etc). Research done in Karachi also demonstrates the same tendency, namely that fertility is higher in women in nuclear families than the extended family (Hashmi, 1965).[9]

Growth of Rural and Urban Population in India (1901-1961)



Urban growth in India

The expansion in the urban population of India, as anywhere else, has taken place in three ways : a) by the natural growth of the urban population, b) by migration from the countryside to towns and c) by accretion to the urban areas of places with their inhabitants which were previously classed as rural.[10]

Calcutta and Bombay are known as "PRIMATE CITIES", together with Rangoon, Bangkok, Jakarta, Singapore Saigon, Manila and Seoul. Kingsley Davis has estimated that the largest city in India may have between 36 and 66 million people in 2000. "The rate of urban growth in developing countries is uniformly between 4 and 5 percent per annum. And, in sharp contrast to the experience of the industrialized countries in the past, migration to the cities, though not unimportant, is often responsible only for the smaller part of this increase. In spite of appalling sanitary conditions, mortality is sometimes lower than in the countryside–something that was achieved only in this century in the advanced countries–and natural increase enlarges these cities rapidly, while those of old industrial countries depended on immigration to make up for their deficit on that account.

In some of the underdeveloped countries, rural population has thus continued to grow almost unchecked by the small flow to the cities.

In the long run, the economic development of these countries will require an increasing transfer out of the rural sector, and the rate of urban growth would therefore have to be stepped up further.

Of all the grave problems in the poor countries, the inadequacy of urban conditions is perhaps the most serious one, not only because of the misery it represents, but because of the crucial political role of the urban populations. The task of

feeding the cities-the central problem of most civilizations in the past-is likely to remain difficult even on the assumption of considerable agricultural progress. And if, as many fear, the population explosion will at one point manage to reverse the declining trend of mortality in the underdeveloped countries, the most likely source would be a breakdown of public health facilities, water supplies and the like, and violent outbreaks of old or new epidemic diseases among populations so densely crowded and so defenceless that it almost seems a miracle that such catastrophes have so far been averted."[11]

The definition of urban or rural populations as adopted here, in most analytical studies, is not sociological but the one used in the Indian censuses.

The term "urban" according to census covers all places classified as towns including town groups and cities. The eligibility test applied for indentifying a place as a town is determined by the a) Administrative criteria and b) urban characteristics. The administrative criteria have been common to all the censuses which have treated all the places, irrespective of population size served by local bodies of towns such as i) Municipal corporation, ii) municipal area, iii) town area committee iv) notified area committee v) cantonment board.

As for the urban characteristics they differ from census to census. In 1901, apart from these categories covered under group A, an area of "continuous collection of houses permanently inhabited by not less than 5000 persons was taken as urban".

(Table : Variation in Male, Female and Total Population in Rural and Urban areas, India : 1901–1961.) —page 91

During 1911-21 whereas the urban population increased by about 8 per cent, the rural population declined by a little over 1%. In the latter decade (1921–31) the increase in the

VARIATION IN MALE, FEMALE AND TOTAL POPULATION IN RURAL AND URBAN AREAS, INDIA 1901 – 1961

Year	Rural					Urban				
	Persons (000)	% Of Total Population	% Increase or Decrease			Persons (000)	% Of Total Population	% Increase or Decrease		
			Males	Females	Total			Males	Females	Total
1901	212,544	89.16	——	——	——	25,852	10.84	——	——	——
1911	226,151	89.71	+ 6.66	+ 6.14	+ 6.40	25,942	10.29	+ 2.37	— 1.88	+ 0.35
1921	223,235	88.83	— 1.05	—1.54	— 1.29	28,086	11.17	+ 9.80	+ 6 50	+ 8.29
1931	245,521	88.01	+ 10.17	+ 9.79	+ 9.98	33,456	11.99	+ 19.63	+ 18.52	+ 19.12
1941	274,507	86.14	+ 11.90	+ 11.71	+ 11.81	44,153	13.86	+ 32.50	+ 31.34	+ 31.97
1951	298,644	82.71	+ 8.76	+ 8.82	+ 8.79	62,444	17.29	+ 39.23	+ 44.07	+ 41.43
1961	360,292	82.03	+ 20.77	+ 20.52	+ 20.64	78,937	17.97	+ 27.43	+ 25.23	+ 26.41
1971		80.1					19.9			

urban and rural population was of the order of roughly 19% and 10% respectively.

The next two decades witnessed a considerable acceleration of the urbanization process. The urban proportion rose by roughly 16% in 1931-41 (from 11.99 to 11.86 and by about 25% in 1941-51 and the growth of the population (urban) was roughly 32% and 41% respectively. During the last decade (1951-61) although the urban population witnessed a growth of over 26%, yet the proportion of urban to the total population increased by only 4%. The total increase in the urban population was not the result merely of urbanization but that of the overall growth of the population. However, consideration has to be given to the definitional change in the classification of population as urban in the 1961 census. If the criteria of the 1951 census is applied for the classification of populution as urban. the total urban population worked out at 85.9 million instead of 78.9 million and the proportion of urban population in the total works out at 19.1% (adjustment does not cover some 78 places, which were classified as urban in 1951, but not in 1961, as their population was not available). The consequent growth rate during 1951-61 would have been 37.6 instead of 26.4%

Population Density

"The density of population is as it were the synthesis of all the geographical phenomena ; it expresses eloquently moreover the manner in which man has taken advantage of the land he occupies."

J. Robert

By population density is meant the number of people per square mile, obtained by dividing the total land by the total population.

Broadly, the history of the world populations has changed from the density — dependent state of the earliest food gatherers and primitive agriculturalists to one of density independence where density is high and increasing, and resources limited. If the world average estimate of 1.7% increase per year in population continues the consequences are unthinkable.

Modern highly productive agriculture can go on feeding increasing numbers for some time in the rich countries, although the situation in the underdeveloped countries is very much more precarious. Whilst the productivity and carrying capacity of the world can and certainly should, be increased, it only delays the time when the human biomass must come into equilibrium with the world's resources. It would therefore be highly advantageous if the population became more density dependent than it is at the present time.

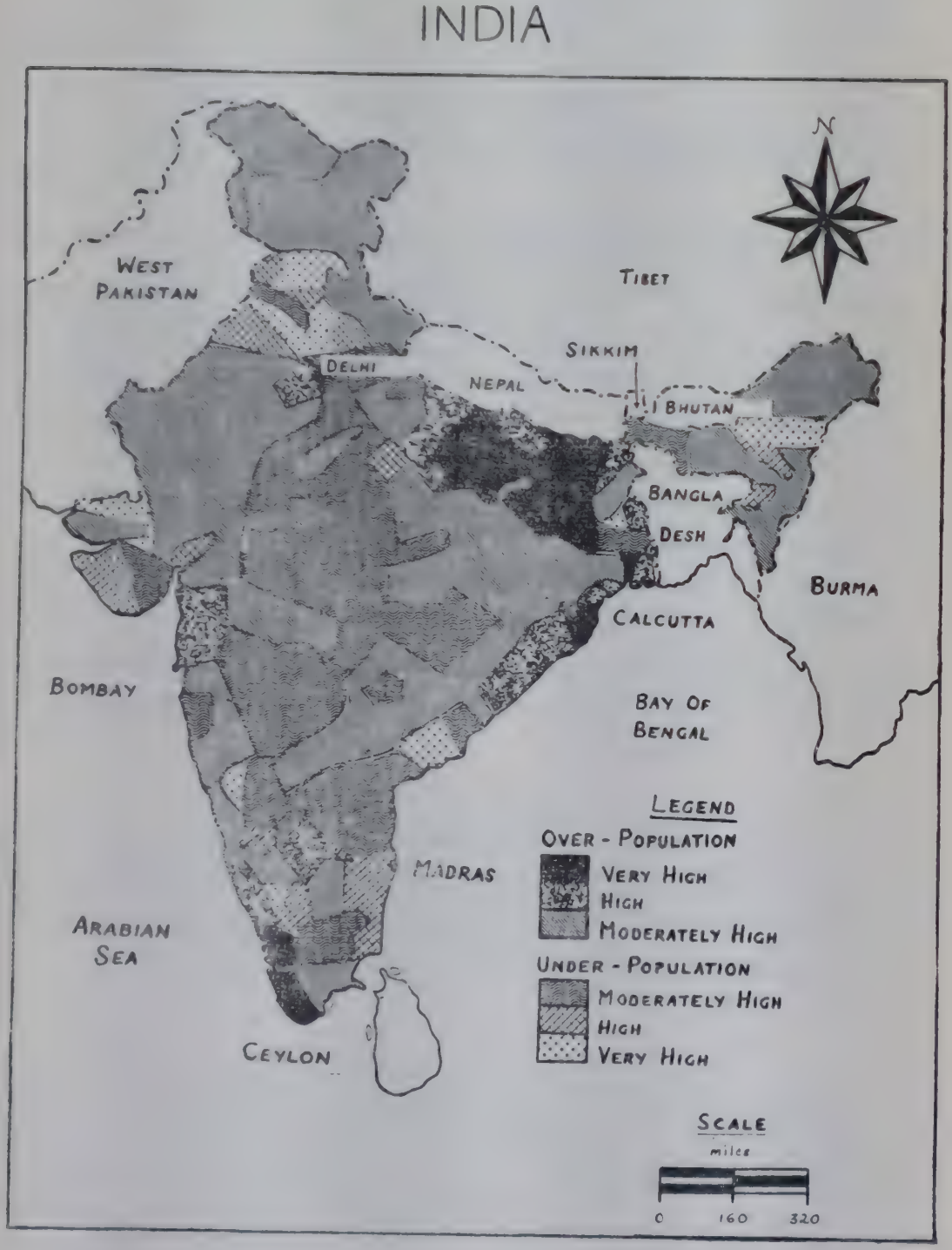
The optimists may say that the problems can be solved by populating an infinite universe and, though this is remotely possible, the environment of Mars is as hospitable to human life as is the peak of Mount Everest The nearest star is 5.88×10^{12} miles away and to accelerate the weight to speed that will get man there in less than his life span would need many times the energy necessary to keep him on Earth for an entire lifetime. Even with an awareness of what scientific technology can do in a relatively short time, it seems unlikely that extra-terrestrial migration will alleviate the over-population problem for some generations to come.[14a]

As a result of the unprecendented population increase in India during the 1951–61 decade, the density of population per square mile for the country as a whole (including Jammu and Kashmir) increased from 312 per square mile in 1951 to 370 in 1961.

India having primarily an agriculture–based economy, land assumes a major significance in any consideration

TOTAL POPULATIONS AND POPULATION DENSITIES OF THE STATES, UNION TERRITORIES AND OTHER AREAS OF INDIA – 1971

Ranking In 1971	*States, Union Territories & other areas in order of population size*	*Population 1971*	*Population per square Kilometres*
INDIA		546,955,945	182
1.	Uttar Pradesh	88,299,453	300
2.	Bihar	56,387,296	324
3.	Maharashtra	50,295,081	163
4.	West Bengal	44,440.095	507
5.	Andhra Pradesh	43,394,951	157
6.	Madhya Pradesh	41,449,729	93
7.	Tamil Nadu	41,103,125	316
8.	Mysore	29,224 046	152
9.	Gujerat	26,660,922	136
10.	Rajasthan	25,724,142	75
11.	Orissa	21,934,827	141
12.	Kerala	21,280,397	548
13.	Assam	14,857,314	149
14.	Punjab	13,472,972	268
15.	Haryana	9,971,165	225
16.	Jammu & Kashmir	4,615,167	—
17.	Delhi	4,044,338	2,723
18.	Himachal Pradesh	3.424,332	62
19.	Tripura	1,556,822	149
20.	Manipur	1,069,555	48
21.	Meghalaya	983,336	33
22.	Goa, Daman and Diu	857,180	225
23.	Nagaland	515,561	31
24.	Pondicherry	471,347	982
25.	North - East Frontier Agency	444,744	—
26.	Chandigarh	256,979	2,723
27.	Andaman & Nicobar Islands	115,090	14
28.	Dadra & Nagar Haveli	74,165	151
29.	Laccadive, Minicoy & Amindivi Islands	31,798	994



POPULATION DENSITY

of population density and it is natural to make comparisons of density in terms of either arable land alone or of so-called agricultural land, i.e. arable plus meadows and pastures.

WORLD REGIONS
TABLE, POPULATION DENSITY AND LAND

Regions	*Density Per Sq. Km. of Arable Land*	*Density Per sq. Km. of Agricultural Land*
Africa	83	21
Central America	113	25
South America	76	14
Asia (excluding USSR)	266	147
U. S. & Canada	15	6
Europe (excluding USSR)	86	52
Oceania	22	1

Source Provisional Report on World Population. N. Y. 1964

Even such comparisons, however, have little meaning unless they are supplemented by careful study of the productivity of labour and of the potential for increasing the amount of agricultural land and the cost of doing so.

In spite of these qualitications, density remains an interesting aspect of the geographic distribution of world populatlon, and in at least one respect it assumes a direct significance in the course of economic development, for it is clear that space itseef is something for which there is a high income elasticity of demand. Privacy and recreation rank high among the wants on which incremental incomes are spent in the developed countries. They may be hard to meet on a world-wide scale a century from now.

Health Consequences of Density and Crowding

Density affects Health, and Crowding has injurious health effects, which occur primarily during the period when the *degree and extent of crowding* is *rapidly increasing*. The effects appear to be much less serious when the rate of crowding is slow and the crowded population has sufficient time to become adapted to its environment.

In many cases, however, it is difficult to isolate the effects of crowding from other conditions such as poverty, poor nutrition, poor housing, and pollution, which formerly characterized all cities and still prevails in the rapidly growing cities of the poor countries, and in the "inner cities" of the United States.

Low morbidity and mortality however characterize crowded areas in countries with high levels of health service and sanitation. For e.g., although *Hong Kong and Holland* have very high population densities, they are said to be enjoying two of the highest levels of physical and mental health in the world.

Both animal experiments and experience with human beings indicate that social stresses due to crowding produce physiological disturbances. In turn, these increase susceptibility to both infectious and non-infectious diseases. The effects are most severe before individuals have had time to become adapted to the crowed conditions.

Density is therefore an important consideration in reviewing the effects of over-population for there are limitations on the area of the earth which man can exploit for obtaining food. For, like other terrestrial animals, he occupies a thin layer of the interface between land and air on the earth's surface. He cannot penetrate to any considerable depth into the earth because of temperature and mechanical restrictions nor, at present can he invade and permanently occupy the atmosphere unless he is

enclosed with an artificial environment simulating that of the earth's surfaee. The sea has been suggested as a possible environment for man, but here again physical problems have to be solved and overcome before he can occupy it.[15]

Beggary : What about beggary? "Mendicancy has become institutionalized due to chronic unemployment and lack of organised charity or public relief. One survey reported that in the city of Bombay alone there are about ten thousand beggars, some 47% of whom are able-bodied. Of the remaining, 18% are aged and infirm, 12% lepers, and 10% blind and crippled. It has been estimated that Bombay citizens alone spend some 3.5 million Rupees annually in indiscriminate charity to beggars and Delhi citizens about 1 million Rupees."

However, overpopulation should not be pointed out as the single factor responsible for all the problems of urban life, although "it cannot be denied that rapid growth of population in the urban and industrial areas has contributed a great deal to the genesis and accentuation of all these issues". Efforts to reduce fertility should be made in the total context of the socio-economic, and politico-cultural needs and demands of the country and the people.[16]

Migration Control

"Population movement across international borders have in various parts of the world and at least various times, been of considerable magnitude, as for example the emigration of Europe to the Americas and the migration between Asian countries in the decades preceeding the First World War. In recent years, however, international migration has declined considerably in importance. Inspite of the improvements made in transportation facilities, International population movements are now of relatively small numerical significance in most parts of the world due, to a great extent, to restrictions imposed by immigration countries.

International migration has recently become more and more selective, favouring the migration of skilled and trained personnel and the migration of such persons from developing countries to industrialised areas has become an important international issue."[17]

However, migration as a measure to help solve the population problem, cannot be the significant help it was in the 17th, 18th and 19th centuries, when it partly solved the problems for Britain and other European countries, *unless the developing countries colonialize the* sparsely occupied areas of the world which by now are few and far between.

This is a very unlikely measure and therefore need not be considered. However, more just and humane laws to control migration, need to be established on a world-wide basis. Discussing migration brings to mind a thought-provoking verse written by Frost of Christopher Columbus : [18]

But all he did was spread the room
Of our enacting out the doom
Of being in each other's way,
And so put off the weary day
When we would have to put our mind
On how to crowd and still be kind.

"POPULATION AND ECOLOGY"

" Man and His Environment "

"I truly believe that we in this generation must come to terms with nature, and I think we are challenged as mankind has never been challenged before, to prove our maturity and mastery, not of nature, but of ourselves."

—Rachel Carson

Ecology is a key word in present day health philosophy. It is derived from the Greek word "Oikos" meaning home or house.

Ecology is defined as the science or study of the mutual relationship between living organisms and their environment. Human Ecology is concerned with the broad setting of man in his environment.

By environment is meant the aggregate of the various factors or conditions which surround or are within man, and which affect his development, i.e., physical, social, biological, chemical, pyschological and spiritual factors.

The health status (by health we mean physical, mental, social and spiritual wellbeing) of an individual, a community or a nation is determined by the interplay and balanced integration of two ecological universes - the internal environment of man himself, and the external environment which surrounds him.

The external environment consists of three major components-physical, biological and social, all closely interlinked or related :

The *physical environment* encompasses the non-living things and physical forces affecting man, e. g. water, air, ventilation, lighting, noise and climate.

The *biological environment* includes the living things of the plant and animal kingdom.

The *social environment* comprises a complex interplay of factors and conditions such as cultural values, customs, habits, beliefs, attitudes, economic status, occupation, religion, standard of living, social and political organizations."

The current human ecological crisis derives from the great technical advances by which man has placed himself in the position of a (self) protected species for whom natural ecological regulation is suspended. Inevitably his numbers have increased to the point where all the resources of the earth cannot supply his wants.

The Uniqueness of man

A review of man's history shows him to be a character playing many parts in sequence. At his "advent" he survived as did other animals, by subsisting on such products as insects, birds eggs, and edible plants, as his surroundings

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COMMUNITY HEALTH CELL
47/1, (First Floor) St. Marks Road,

proffered. With increasing awareness of what his environment had to offer, the trend was in the direction of specialized collecting, for e.g. of fish or game or fruit, and indeed he may have been a collector of all these at different times according to their seasonal availability.

Later, on the basis of experience, subsistence cultivation of edible crops on a limited scale was practised and this phase marked the beginnings of a change to a partial control of the environment by man.

Man, in our own image, did not appear suddenly out of the blue some 10,000 years ago. Like other animals he is a product of a relentless process of adaptation to changing conditions in the environment. That he has been able to survive the environmental vicissitudes is due in no small measure to the fact that he was not, and is still not, specialized in ways that commit him to one or another particular and restricted way of life. In this he contrasts with other animals who may for example, require particular diets. Should the sources for these disappear for any reason, the animals dependenl on them die.

From the time when man began to evolve away from the basic stock some 30 million years ago, he has altered all terrestrial systems to a greater or lesser extent.

On pollution of the environment, McCormack says, "Population increase is partly the cause of pollution of the environment. Primitive man was responsible for very little pollution, because his numbers were so small."

Technological man is responsible for great environmental problems because he is getting increasingly sophisticated in his needs. In the early Indian city of Mohen-jo-daro which covered in the region of a square mile, the layout was complex with a network of roads and alleys. There had been much thought, presumably on the part of municipal authorities'

for the sanitary needs and health of the population. An elaborate drainage system had been devised with connections from the houses to the main street drains, which eventually linked with soakpits. Rubbish chutes were also constructed running out through house walls into brick-built bins outside. In this city placed in time between the third and first millennium B.C., we see evidence of population density linked with degrees of orderliness and organisation which suggests that some aspects of pollution were fully appreciated and active steps to combat them had been devised even in those days.

Don R. Arthur in his book "Survival : Man and his Environment" uses the term "*Ecological Death*". He writes, "A further cause of death is related directly to ecological factors and may be considered as being (a) *eco-alimental* associated with starvation, malnutrition, deficiencies of diet, of minerals and of vitamins ; (b) *ecopathogenic,* associated with diseases brought about by pathogens, irrespective of their method of transmission ; (c) *ecometabolic* in the sense that either foreign non-living materials may be incorporated on, or in, human tissues or may, by virtue of their chemical nature, poison or stimulate multiplication of cells, all of which induce mal-adjustment of function. By and large it includes occupational diseases, conditions induced by affluence as well as by poverty, and of stresses and strains imposed on man's body as a result of modern-day living. (d) *ecophysical* death is directly attributable to physical body damage sustained in work, at play or in war.

Pollution of Land

Pollution is defined as " the introduction by man of waste matter or surplus energy into the environment in a manner directly or indirectly causing damage to persons other than himself, his household, those in his employment or those with whom he has a direct trading relationship. Therefore wastes that are disposed of in a manner which does not cause third party damage is not pollution. "

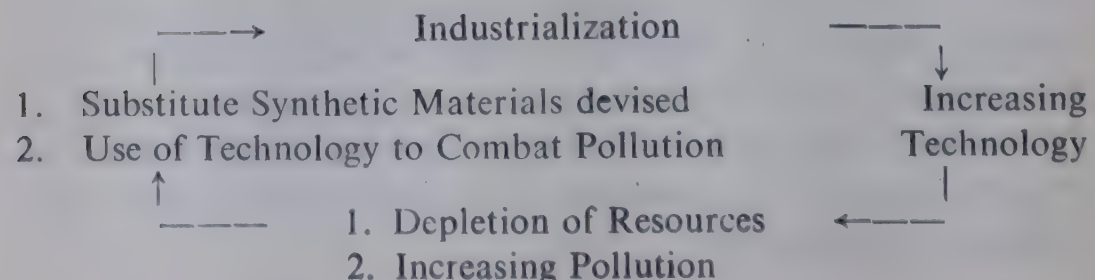
The aspects of environmental pollution varies in developed and developing countries.

In the U.S. or Western Europe the relatively low price of owning and operating private automobiles, closely associated with the rise of a mass market due to a large population and high incomes, has been a prime factor in making faraway places accessible, but the same automobiles in urban areas produce noxious gases that now befoul the air beyond the air's capacity to dilute or transport them. What is the net effect on the quality of life? Would the benefits of overcoming the adverse by-product, through new technology or through the modification of economic incentives or both, be sufficiently attractive to stimulate manufacturers and users to pay the costs of developing and using products that do not befoul the air ?

In "1976 : Agenda for Tomorrow" Stewart Udall, former Secretary of the Interior, wrote, challenging Americans, "We have had no environmental index, no census statistics to measure whether the country is more or less habitable from year to year. *A tranquility index or a cleanliness index might have told us something about the conditions of man, but a fast growing country, preoccupied with making and acquiring material things has had no time for the amenities that are the very heart and substance of daily life.*"

"It is not the poor, but the rich who threaten the survival of spaceship Earth."

E. F. Schumacher



Erlich says " While the American economy has been growing, freedom has been shrinking. Greater and greater controls must be applied to everyday living, and restrictions will inevitably grow more severe as population increases. The use of automobiles, boats and private aeroplanes will become even more circumscribed. The keeping of pets, especially those that are noisy or consume substantial amounts of protein will be forbidden. Increasingly, access to recreational areas will be strictly rationed. Bureaucracy will continue to grow as the Government tries to solve more and more pressing problems with less and less success."

Americans are among the world's largest per capita oxygen consumers ; ecologist La Mont C. Crele of Cornell University has calculated that, for the 48 contiguous U. S. States in 1969, oxygen production was only about 60% of the amount consumed. He continues, " We are poisoning plants on land and in the sea in various ways at an alarming rate. An estimated 3,000 chemical compounds have been added to the atmosphere by man and we are dumping as many as half a million pollutant substances into the ocean. America has 6% of the world's population and uses 40% of the world's fuel. "

According to conservative estimates, one person in North America causes on the average 25 times more environmental damage than one person in India. This means that one less child in North America would prevent 25 times more environmental damage than one less child in India.

" Whereas living at the margin of subsistance in developing countries allows little to be finally disposed of or abandoned. i. e. the rate of re-cycling is high, low income restricts both the magnitude and the variety of consumption of energy in all its manifestations. The ills caused by poverty leaves little room for concern about – or expenditures for – the environment in ways that do not preoccupy many people in high income countries.

The kinds of environmental adversity that exist for the less developed countries result much more from rapid population growth combined with a lack of technology than from rising incomes and the presence of a new technology. In the main the developing countries are characterized by a relatively high rate of population increase which exceeds their per capita growth rate (as indicated by Gross Domestic Product per head.) The G. D. P. has risen together with Total Waste for U. K. Both population density and affluence relative to the surface area of a country (G. D. P./km^2) have been put forward as crude comparative indices of the potential levels of pollution at any one time.

Certain environmental phenomena could, if continued, threaten the survival of man. They derive basically from alterations in certain ecological systems, brought about by man–made interferences. Modifications in the heat balance of the earth, ocean pollution, effects of radio active waste emission in the air or water and genetic mutations triggered by chemicals are a few examples of such contingent threats. These contingencies deserve the most careful investigation and monitoring, particularly in the developed countries today, because here even a very small probability of a very serious result should give rise to remedial action. "During a recent State of Union Message, President Nixon devoted two thirds of his time to the question of rehabilitation of the environment. But examination of projected and therefore presumably desired production rates for certain ecologically disastrous products such as plastics indicate that the U. S. Govt. and the U.S. business corporations are committed to growth rates for these products of the order of 5 – 7% during the next decade.

In the U.S.A. 360×106 tons of garbage are produced every year. I wonder how many tons of food are thrown away in that garbage ? Enough to meet the food needs of the poor in Latin America ?

On the other hand, developing countries should learn from the experience of these countries, and while planning

and deciding on priorities, give a high place to the protection of the environment for the benefit of the people. Legislation and its strict enforcement should be laid down whenever materials that could possibly harm man or his environment, are being used.

There still exist numerous environment hazards that could be at least partialiy controlled.

Pollution of Man

Environment and Human Development

The environment — natural or man-made, physical, chemical, biological and *social* — has a significant effect, whether direct or indirect on human development.

While scientific knowledge of the environment is growing, there is still much to be learned about its immediate and long term effects on human development. Furthermore current knowledge is not always applied, or not used in the best way to improve the quality of human life.

When one uses the term pollution in its broadest sense one can apply it to man, where I use it to explain the waste of a human being due to reasons which should not be allowed to exist.

The term "*Child Wastage*" — i. e., the Demographic Index indicating the percentage of the population who fail to survive to the productive age (from the dependent age) when they can contribute to society, is 40 for India (4.1 for U.S.A. and 6.4 for Japan.)

From malnutrition and infection (eg. tetanus) in India, to the Battered Child Syndrome of the U. S. A. and the U.K. — the key lies in the environment both physical & emotional of the child to a very great, though yet not fully appreciated, extent.

One has often to go back to the feeding habits of the infant, when even at that stage the environment plays an important part, perhaps the most important physical part in the childs's development.

When the child can no longer be fed on a diet consisting entirely or mainly of breast milk, and when he becomes too heavy to be carried conveniently and too active to be kept at his mother's side or in some other relatively safe environment, he is exposed for the first time to the normal adult environment of his family and community. In some cultures, weaning is abrupt and also marks a change of attitude towards the child; if the child is brought up to behave passively, his behaviour pattern will sooner or later have to be reversed, and this reversal may be very harsh.

If the environment of the community is grossly unhygienic, the child is exposed to a host of infectious agents that he is physically unable to withstand. Such exposure, with modifications, continues throughout life, but children who survive the initial encounter with infection and infestation, acquire their own defences of active immunity. For millions of people in poor communities, the hygiene of the physical environment remains extremely unsatisfactory and dangerous. The absence of adequate facilities for the disposal of excreta accounts for the high prevalence of bacterial, viral, protozoal, and helminthic diseases. The lack of a plentiful, convenient, and safe water supply complicates efforts to maintain a sanitary environment, to keep food clean and to practise good personal hygiene. Overcrowding and lack of ventilation predispose children to a host of airborne infections. Despite notable advances in control, insect vectors continue to be the major carriers of infection in many parts of the world.

It is worth recalling that modern health programmes began in the 19th century with environmental hygiene, which was used to combat many waterborne, airborne and other

kinds of infection at source at a time when there was interminable and often fruitless speculation about the nature of epidemic diseases and their relation to sanitary, meteorological and geophysical conditions.

In the 20th century, science and technology have solved many riddles regarding the origin of disease, but have introduced a host of new problems. Morever, release from the necessity for physical effort has committed man to a sedentary way of life; commercial production of food has exposed him to refined foods and food additives; industrial expansion has subjected him to chemical and other pollutants; and the mass production of pharmaceuticals has exposed him to the use of drugs, sometimes for non-medical purposes.

The dangers of 'overdevelopment' can be applied with significant meaning to the use of many medications today.

The Erosive and Depository actions of man

With ever-developing skills and aptitudes, man has become increasingly proficient in overcoming what to his primeval ancestors were environmental limitations. Accordingly, as he has progressed through time he has left, and still continues to leave, scars on the earth's surface either as eroded features or as deposits.

Man's erosive influences

Probably something like 28 million square miles of woodland covered the surface of the world at its greatest extent, but this has now diminished by about 50% and, according to Ovington, little if any primeval forest remains. In part this is due to changing climates; nevertheless, over the last 3,000 years man has increasingly modified the natural vegetation and ruthlessly exploited the forests.

The development of agriculture, the exploitation of forests for fuel, for building of ships and houses, in the past, presents another modifying effect on ecosystems.

Developments in industry were subsequently superimposed on the agricultural way of life, and the industrial revolution brought man into the space and jet age.

It seems likely that primitive hunting man viewed forests with some fear, for they harboured enemies and wild animals. Accordingly the forests were burnt to drive out these enemies and the animals they contained.

Man was probably an indiscriminate collector of readily accessible materials, but with the development of tools and the use of fire, however, his range of foods increased for he could now include larger animals in his dietary. Thus, it was for millennia that man was a food gatherer rather than a food producer. Because of the absence of any bond to the soil, man could only be a predatory rover, and his food and his mental attitudes were conditioned by his way of life. Family groups of fifteen to twenty individuals normally constituted the largest community having any degree of permanence under a vegetable food gathering economy.

The interrupted changes in climate associated with glacial movements extended both animal and human movements beyond previously known levels. Hunting was supplemented by fishing, fowling and sealing.

The partial shift from collecting to food producing during the neolithic revolution was the result of man's conscious selection of edible and palatable vegetation. Such selection marks the first step towards crop husbandry and probably plants like bananas, taros and yams were the first to be cultivated.

With the acquisition of cultivating skills by the neolithic peoples, small clearings were made in the forest by

removing and burning the trees, the burnt remains enriching the soils sufficiently to allow crops to grow. Gradually the fertility of the soil being exhausted, the site was abandoned, and a new clearing made. By this means a shifting system of cultivation emerged.

Throughout history the woodland pattern has been in a state of flux. It has been affected by hunting, it has provided wood for building (ships, homes, etc.), firewood and charcoal. The exploitation of natural woodland sometimes has unfortunate consequences. With the removal of the trees the exposed surface layers of the soil are frequently removed by physical agencies, and where this happens near streams of rivers it accentuates flooding downstream by excessive run-off surface water.

The first cultivation of plants took place in the tropics. Centres for crop growing developed in South East Asia, South West Asia and in the American tropics. The people of the Near East had barley and two kinds of wheat, those in the South East Asia grew bananas, taros and yams and those in South West Asia, wheat, oats and barley. Several negatively propagated crops, corn and a variety of vegetable and fruits were the bases of the crop husbandry of tropical America.

There is, however, no reason for believing that crop husbandry formed the exclusive agricultural practice of neolithic man. There is evidence that in Iraq the domesticated goat was kept and possibly pigs, sheep, cattle and horses as well, whilst South Asia is considered to be the original home of the pig, fowl, duck, goose and perhaps the dog.

However, to return to man's continuing use and exploitation of the land, we see other scaring effects like open-cast mining, which usually involves lowering the water table by the pumping out of accumulating water. This influences the plants in the neighbourhood of the open-cast ; roots which normally reached the old water table are now above it. Later

abandonment of these sites lead to flooding and formation of lakes or marsh which is unsuitable for cropping or for pasturing stock.

However, they may, where used for supporting stock, be ideal foci for the establishment of liver fluke disease and tick borne red water fever by providing environmental conditions conducive to the survival and the multiplication of the causal organisms.

Overlying these considerations is the fact that of primary importance for survival is the need to obtain food and ultimately all animals, including man, depend on green plants for this.

By using solar energy in the form of light, green plants can synthesize complex chemical compounds from the simple modules of atmospheric CO_2, water and water soluble substances from the soil.

Briefly, in ecological terms, the feeding sequence so far involves primary production as represented by the growth of green plants, and of their consumption by the herbivores like rabbits or cows constitute the food of carnivores, such as foxes and lions and these are secondary consumers. Man can be either a primary or secondary consumer or both— that is, he can feed on plants or animals or both, and so we constantly return to the soil as the constant factor or base.

Soil fungi and bacteria play a very important role in aiding decomposition and breaking down unwanted residues of biological origin and soil fertility may be greatly endangered by the indiscriminate use of pesticides. Soil erosion due to over cultivation and the practice of mono-culture are of grave importance today.

Man, as an agriculturalist, removes crops from his plots, eats them and discharges nitrogen compounds as urine and digested food residues (faeces) to sewage effluents and thence

to the sea. Here, they may be either deposited in shallow marine deposits, possibly to enter a nitrogen cycle involving marine organisms, including birds which feed on them, or the nitrogen may be lost to deep-sea sediments. Because of this break in the cycle, fields become impoverished in nitrogen and maintenance of good crops need replenishment of nitrogen by the use of artificial fertilisers. Chief among these are ammonium salts from coal — the nitrogen of ancient forests — sodium nitrate (from Chile) as deposits formed by the decay of seaweeds or nitrates or ammonium salts synthesized from the air.

Of the sedimentary group of elements, phosphorus is particularly important, for it is required in nearly all basic energy transformations that distinguish living proto-plasm from all that is inanimate. Since its reservoir is mostly of mineral origin, there is a tendency for depletion and dispersal as a result of weathering.

Airborne dust, volcanic gases, salt spray, coastal waters and birds feeding on sea fish (which in turn feed on plankton rich in P_4) return a certain amount of P_4 to the land, but on a world scale such areas are localized. The non return of sewage effluent by modern disposal methods, and intensive and continuous cropping, lose phosphates and the use of artificial fertilisers to make good thie loss has been necessary.

In many cases however. man has so increased the rate of erosion that there has been a one-way movement of P_4 into a non-available reservoir or into deep subsoil. Consequently, the present natural means of return are totally inadequate to keep up with the downhill loss.

It is interesting to note that economists point out that the coffee trade has "enriched Brazil," ignoring the ecological effects of what George Borgstrom describes as the "almost predatory, exploitations by the planters." Brazil's dependence on this commodity has not only ruined much of her soil,

but is also a major reason why she cannot adequately feed her population today.

The eminent ecologist Frank Fraser Darling speaks of the effect that man has had and is having on the economy of nature ; Africa has been mentioned mainly with regard to its life conservation. He stressed the dangers of our present rape of the earth and the need for a concerted policy of keeping an ecological balance between man and his environment.

The ideal aim of community medicine is precisely that ; keeping an ecological balance between the human society as a whole and its environment.

In an address to participants in a Conference in Tokyo in June 1973, Erlich describes vividly "The Destruction of Ecosystems" by man. At least in industrialized nations, most citizens have become aware of the direct effects of pollution on human health, but few seem cognizant of a potentially much more serious aspect of environmental deterioration : man's assault on the integrity of the natural environmental systems of the Earth. The conditions that makc Earth hospitable to human life result from complex and perhaps fragile balances among the great chemical cycles — water, nitrogen, carbon, oxyen, phosphorous, sulphur — all powered by the energy of the sun. Deadly ultraviolet radiation from that same lifegiving star is kept out by the tiny trace of ozone in the atmosphere ; the trace of carbon dioxide maintains the Earth's surface at tolerably warm temperatures by preventing heat from escaping into space. Organisms regulate the environmental concentrations of nitrites, ammonia, and hydrogen sulfide — all poisonous — and, in the much longer term, the concentrations of atmospheric nitrogen and oxygen as well.

In his tenure of some thousands of centuries on this planet, man has learned to modify and to exploit the environment to his advantage in many ways : to clear, to plant, to mine, to dam, to dredge ; to domesticate animals, to breed

varieties of plants and animals more suitable to his needs, to increase the yields of crops, fish and fibre he extracts from the natural systems of the planet. **Yet, in the last third of the twentieth century, man still cannot claim either full understanding or control of the environmental systems that support his growing population.** This is the central truth of the man-environment relationship today : man is still part of nature, not master of it. He is exploiting 40 percent of the Earth's land area ; he has reduced the mass of land vegetation by one third ; he has power beyond precedent to influence natural environmental systems. *But power is not control."*

Man's Depository Influences

Deposited material on the earth's surface, in so far as it applies to waste products falls under the categories of

(1) Wastes of immediate biological origin such as faeces and decomposed or decomposing bodies of animals and plants.

(2) Wastes of industrial processes.

(3) Wastes of domestic origin which may include elements of both (1) and (2).

Increasing domestic rubbish contains paper, tins, glass and plastic containers, and pose serious problems of disposal.

Every acre of industrial wasteland detracts from the environment by reducing space which could, and should be more profitably used.

> Wastes of immediate biological origin are considered under the heading "Water" in so far as it affects it most. However, one aspect, namely land pollution by indiscriminate defaecation is a serious problem in certain parts of our country especially as it is ususlly present where pure H_2O is not available. The danger of Hookworm Infestation, with consequent anaemia, poses a serious threat to positive health.

Industrial Pollution of the Environment

Man cannot live for more than five minutes without air — clean pure air, containing life sustaining oxygen-and yet, in his daily life when he breathes in some 425 cubic feet of it-how clean and pure is the air ? what percentage of oxygen does it contain ?

Atmospheric Pollution has become an everyday phrase - and yet what does the individual do at his level to prevent the situation and what remedial measures keep atmospheric pollution to the minimum ?

Air is the name given to the mixture of gases which envelopes the Earth, and the term atmosphere is generally used to denote this gaseous envelope.

(Atmospheric conditions can be now predicted by the artificial earth satellite and the high speed electronic computer. The World Meteorological Organisation has the task of preparing the plans to ensure the proper application of modern technology).

Air is a mechanical mixture of gases. The normal composition of external air by volume is approximately as follows :

Nitrogen	—	78.1 percent
Oxygen	—	20.3 percent
Carbon Dioxide	—	0.03 percent

The balance is made up of other gases which occur in traces, e.g argon, neon, krypton, xenon and helium. In addition to these gases, air also contains water vapour, traces of ammonia and suspended matter such as dust, bacteria spores and vegetable debris.

Notwithstanding the knowledge and progress man has made in coming to terms, and even often dominating the

environment, there is now serious concern regarding increasing pollution of air as a world phenomenon.

Air is rendered impure by

(1) Respiration of man and animals

(2) Combustion of coal, gas, oil, etc.

(3) Decomposition of organic matter, and

(4) Trade, traffic and manufacturing processes which give off dust, fumes, vapours and gases.

Under ordinary conditions, the composition of outdoor air is remarkably constant. This is brought about by certain self-cleansing mechanisms which operate in nature such as sunlight, rain, the chemical effect of oxygen and plant life. When the rate of pollution becomes too high or when the cleansing process becomes ineffective, it constitutes a health hazard.

The chief danger to atmospheric pollution is from wastes of industrial processes, including transport fumes.

Atmospheric Pollution in India

"He will manage the cure best who forsees what is to happen from the present condition of the patient."

— Hippocrates (ca 460-377 B.C.) —

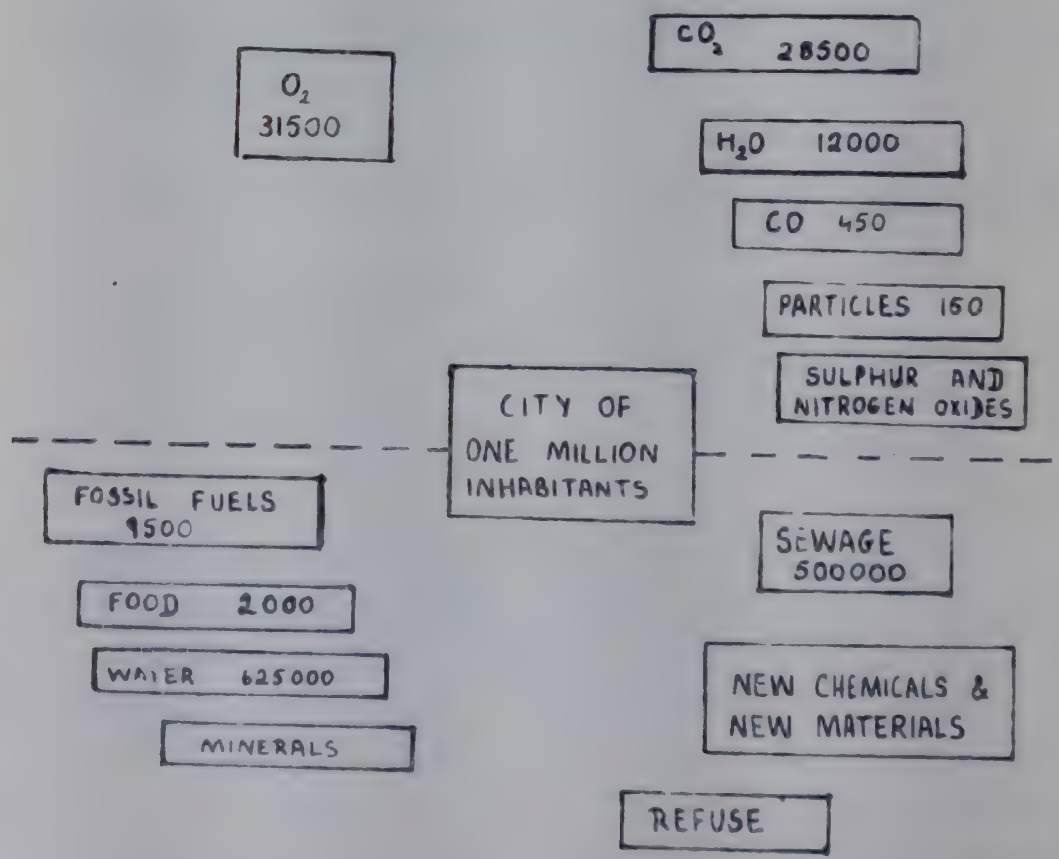
Atmospheric, or to put it more simply, air pollution is becoming a serious problem in cities and towns in India. Even in rural areas, within the home, the discomfort and harm caused by burning leaves, cow dung cakes and smoke-emitting fuels is a serious hazard to the lungs and eyes making the individual susceptible to irritation and infection of both the lungs and eyes.

Lack of proper planning of some industrial complexes, their proximity to large residential colonies, lack of proper legislation or its enforcement and inadequate safety precautions are some of the problems that exist, causing major hazards to health of both workers and their families.

In the West a large amount of money spent on research, publicity and the use of safety measures is being used to combat pollution. It is well-known that chronic bronchitis, emphysema, asthma and lung cancer incidence is directly related to the amount of pollution.

In India in 1968, the Central Public Health Engineering Research Institute, Nagpur, carried out air quality surveys in Bombay, Delhi, Calcutta and Kanpur. It also set up a network of laboratories in 9 cities in India to monitor air

THE GROSS METABOLISM OF A CITY OF ONE MILLION INHABITANTS. THE FIGURES REFER TO THE NUMBER OF TONS OF SUBSTANCES FLOWING IN AND OUT OF THE SYSTEM PER DAY



quality. The Nagpur Centre is an established WHO Regional Centre for the monitoring and research of atmospheric pollution.

It can be seen that these nine cities have large populations which are daily increasing by thousands, e.g. Bombay, Delhi, Calcutta, Madras, Hyderabad, Kanpur, Jaipur, Ahmedabad and Nagpur.

The following tables indicate atmospheric pollution:

Table

Atmospheric Pollutants in Calcutta

Atmospheric Pollutants	*Range*		
Sootfall	39.38	—	90.98 tons/sq. mile/month
Sulphur Dioxide	0.021	—	0.058 p. p. m.
Oxides of Nitrogen	0.043	—	0.122 p. p. m.
Ammonia	0.160	—	0.266 p. p. m.
Aldehydes	0.04	—	0.12 p. p. m.
Respirable Dust	0.071	—	0.600 mg/cu. m of air.

Table

Suspended Particulate Matter

City	*Suspended Matter Mg/m*
Bombay	238
Calcutta	527
Delhi	700
Kanpur	488
London	221
New York	134

Health hazards due directly or indirectly to atmospheric pollution are seen in man as Bronchitis, Emphysema, Asthma, Lung Cancer and other forms of Cancer (due to radio

active fall out). In industry, workers improperly protected are particularly susceptible to Pneumoconiosis and Tuberculosis.

Individual Ventilation

It is extremely important from the health point of view that over-crowding be avoided. It is generally considered, that a space of 1,000 to 1,200 cft. per person is adequate if 2 or 3 air changes occur in one hour.

The extent of floor space per person is calculated upto a height of 10-12 ft. (as air in heights above this level does not take part in air exchange). The recommended floor space per person varies from 10 to 100 sq. ft.

The growth of cities has produced the most significant pollutions of too many people crowded together. People have to breathe in air laden with soot, half-burnt particles of metal, rubber and asbestos, ash, gases such as sulphur dioxide and carbon monoxide. Over 3000 foreign chemicals have been identified in polluted atmosphere and human lungs have to breathe in what corrodes concrete and mortar chimney stacks and steel exhaust pipes. Hodgson, McCowell and Cassell were able to determine the significant relationship between increasing air pollution and the mortality rate due to cardiac and respiratory disease, especially if pollution accompanied wide variation in temperature.

The number of vehicles in India is increasing by leaps and bounds and in Bombay city alone (1970) there are 1,35,000 motor vehicles besides a large fleet of double-decker buses.

The cutting down of trees to build houses and roads, the burning of fuels, the emission of vehicular smoke and fumes are all directly associated with a growing population. Also, India accounts for the greatest number of car accidents in the world. The casualties in India were eight per thousand

against 0.5 percent in European countries, says the Law Commission in its 51st Report

There are smoky Industrial affluents belching into the atmosphere contain black soot, tarry material, ash, SO_2 and acid droplets (Hydrochloric, nitric and sulphuric acids). Though the acid produced is partly neutralised by the available bases, nevertheless free acid does occur in some dust and rain samples.

Plants and crops are adversely affected by atmospheric pollution. Moreover, smog or fog blocks out the sunlight (with its valuable and healthgiving U. V. rays) and decreases the available solar energy up to 40%.

Even worse, the concentration of carcinogenic compounds 3-4 Benzpyrene in the urban atmosphere is (in Liverpool, U.K. for example) 8-12 times that present in the neighbouring rural areas.

Animals and birds are also known to suffer from lung conditions like Anthracosis and silicosis which also makes them (like man) more susceptible to tuberculosis which is often fatal.

Ozoneides (ozone resembling gases) are formed where there is high petrol consumption and cause irritation to animal and human mucous membranes even at concentration of 0.1 ppm. It also damages plants.

Flourides from fodder which has been contaminated to the extent of 35-50 ppm from the atmosphere may be toxic to animals eating it. In excess it softens the bones, stiffens the joints and rapidly erodes the teeth of the vertebrates.

Nuclear Pollution

When high-energy nuclear particles, with no electrical charge, are produced by reactors or weapons, they too can activate materials that lie in their paths and produce another type of radio-active isotope or non–fission product, such as radio isotopes of carbon, zinc and iron. Both these and fission products are discharged either into the atmosphere or stratosphere by small and large weapons respectively, eventually coming to earth with rain, dust or other natural "fall-out" as atomic dust. The area involved may be restricted to a few hundred miles or be world-wide in its effects and, even though no more nuclear bombs were to be exploded, the atmosphere would still be charged with radioactive wastes produced by the peaceful use of nuclear power.

Of the radio active products produced by man the fission product *Strontium 90* is of considerable concern. It is a common component of both atomic fall-out and atomic wastes throughout the world, and its persistence (it has a half-life of 28 years) renders it more harmful. Chemically, it behaves like calcium, following it into biogeochemical cycles, where it is readily absorbed by plants through the foliage and by way of the soil and water. Man and animals feeding on contaminated vegetation, concentrate it in their tissues, and it is retained by bone in close proximity to bone marrow, which is especially sensitive to radiation damage.'

Water Pollution

Water— a basic human requirement should be safe and wholesome. Moreover it must be supplied in adequate quantity for personal use first and then for public, industrial and agricultural purposes. The food and raw materials needed by the world cannot be raised without water. Water is therefore an essential factor in the economic, social and cultural development of a community.

Water is said to be contaminated when it contains infective and parasitic agents, poisonous chemical substances, industrial or other wastes or sewage. The term polluted water is synonymous with contaminated H_2O. *Pollution and contamination are the result of human activity.*

A daily supply of 150 to 200 litres (35-40 gallons) per head is considered an adequate allowance, though even this is not available to the vast majority in the Third World.

The world's supply of fresh water starts rainfall, and man can only live and prosper where he has adequate fresh water supplies.

The hydrologic cycle, which produces the rain demonstrates clearly the interdependence of air, water and land. Most of the water vapour in the atmosphere comes from the evaporation of the water in the oceans. This water vapour falls to the earth's surface as rain, hail or snow. Some of it may evaporate back into the atmosphere, or it may penetrate into the soil and sustain plant life, or flow along an impervious layer of soil or rock and finally emerge as a spring or provide underground H_2O for wells and rivers and finally reach the sea. (The study of water on or near the surface of the land is Hydrology and that of the water on the oceans-Oceanography)."

'In the modern world, increased attention is being focused upon the oceans. As a medium of transportation the oceans have assumed new interests : the increased importance of the oceans as a source of protein for the sustenance of the ever – increasing world population, the exploitation of the mineral and gas resources of the oceans themselves, even the use of the oceans as a dumping ground for radio–active waste material – all these and other factors serve to bring to light the importance of the oceans and the need for Oceanography to be given proper attention.

The World Weather Watch has also been established in 1968 to help all countries with important information obtained regarding weather and climate. It will further the safety and efficiency of international air and sea transportation and provide essential support to nations in the management of water resources and for production.

In considering the effects of pollutants on rivers it may be considered separately, such as.

1. *Physical Effects* which would include a) alterations of temperature such as are brought about by the use of large quantities of river water for cooling in industry.

b) The introduction of suspended in soluble matter which manifests itself by turbidity or change of colour and, on settling, in altering the nature of the substratum.

c) The occurence of oil films or detergents of variable thickness on the surface.

Chemical changes produced by

d) an increase in organic products with such further side-effects as a reduction in the amount of dissolved 0_2 and the emission of noxious gases and

e) the discharge of chemicals as by-products or by accidents from industrial and other sources.

Biological consequences such as the growth of sewage fungi or the destruction of fish are concomitant changes arising from alterations in either or both of the physical and chemical states of the river.

Changes in temperature adversely or favourably affect fish life and this fact should be exploited for growth of fish whenever possible.

Insoluble matter in suspension affects plant and animal life. So also oils and detergents which impede re-oxygenation of water by forming surface layers.

Sewage discharged into river water may demand (Biological 0_2 Demand) excessive 0_2 held in solution for the fungi, bacteria and protozoa to oxidise the organic matter in the sewage and render it harmless. When this occurs the breakdown of organic matter is only partial and the water becomes overloaded and a serious hazard to health.

Poisonous Chemicals Acids and alkalies, chromium salts from tanning and electroplating, phenols and cyanides from gas works and soluble salts of copper, lead and zinc from mine dumps are among some of the chemicals finding their way into natural waters.

Sulphites and sulphates occur in effluents from many industries, and since they are inorganic reducing agents they draw upon the oxygen reserves in river water, so also ferrous salts.

Chemical effluents make heavy demands on O_2. Toxic compounds like nitrates from fertilizers and pesticides used in agriculture are dangerous and difficult to remove.

The contamination of an aquatic environment may present a special case when compared with that on land, for the oxygen levels in water are much lower than they are in air. Accordingly, to obtain sufficient O_2 aquatic animals have to pass large quantities of H_2O through themselves and in this way probably act as concentrators of added chemicals.

When such contaminated fish are preyed on by fresh-water and marine fish-eating birds there is a build up of residues in these birds to such a degree as to be fatal. A close watch should be maintained on the levels of organo-chlorine insecticides in those fish which are used as human food.

Fat soluble insecticides may only become operative in the vertebrates when fat reserves are mobilised in migration or when over-wintering, with harmful or even fatal results. Usually it is not a serious hazard to man, for sufficient time is normally allowed before the affected material is eaten.

It should now be apparent why ecologists are unimpressed by claims that only blessings (and profits) have been brought by the use of synthetic pesticides and fertilisers, including the saving of lives through the use of DDT in malaria control.

The recent explosive growth of population, demand ever-increasing levels of food production to satisfy the basic needs for survival. To achieve maximum yield, competitors for man's food resources must be reduced in number or even eliminated. This brings us to the creation of a new industry of pest control producing weed killers. fumigants, fungicides, herbicides, insecticides, asaricides and pesticides and in their marketable form these are incorporated into dusts, sprays, aerosols, gases or liquids.

One of the difficulties associated with the use of pesticides is that in their passage through food chains they cause death and sterility in many taxa for which they were not intended. From this point of view some of the chemicals used may constitute a hazard for man. This is brought about by the toxic substances accumulating in the tissues of organisms in a food chain, as a result of which the concentration of the chemical is increased far above that of the original application of the dose.

Chemicals applied to soils may harm plants and/or soil organisms which are indirectly of significance for higher organisms. If left on the soil surface pesticides volatilize and weather with consequent degradation, but if applied to cultivated land they may be buried to a depth of four inches or so and later with successive cultivations be returned to the soil surface. Thus soil fertility is greatly decreased.

Fungicides generally, except for those incorporating copper and mercury salts, have a low toxicity to mammals, and most do not persist in soils. Herbicides purport to be selective in that they kill certain groups of plants, although simazine, for e. g. has to be applied with care. Some compounds have a high residual toxicity, especially where there is much organic matter.

Probably BHC (or Gamexane) is the most poisonous and it frequently taints root crops. Apart from copper derivatives, which kill earthworms, most fungicides are not normally toxic to soil animals when used at the recommended concentrations. Insecticides are, of course designed to eradicate particular arthropods and persistence of action over long periods appears to be a desirable quality.

However, any suggestion of a reduction in their killing properties results in further application of insecticides. This has now occasioned concern, for several insecticides persist for a long time in the soil and produce undesirable accumulations.

The elimination of saprophagous mites is one of the harmful side effects for these insects decompose organic matter.

There is an urgent need for organized programming of research in the field of environmental contamination for most of our information on common pesticides is most sketchy.'

The issue of population growth if often raised in connection with concern about envirnomental protection and the quality of life. *What is the relevance of psychological studies in population to the problems of urbanization, pollution, and general ecology?* The importance of these problems is beyond question and their current salience in the public mind is apparent, but the potential contributions of psychology are not easy to formulate. Only a few tentative considerations are offered.

First, there is the interaction among *numbers, appetites and resources*. Threats to the environment are posed not only by numbers of people but by numbers combined with habits of consumption broadly defined. As has been pointed out by Mayes (1969) the rich pose a greater threat than the poor ; they occupy more space, consume much more of each natural resources, disturb the ecology more and create more land, air, H_2O, chemical, thermal and radio - active pollution.

Mayer argues that as disposable income increases, population must decrease.

Perhaps there is a role for psychology in studying the factors that produce an excessive appetite for goods and services in some strata and some societies and in analyzing the psychological basis for man's exploitative view of nature. Are there means by which a psychological ceiling can be placed on consumption, apart from controls on in come or production ? Can disposable income be channelled toward uses that are psychologically satisfying but not ecologically disruptive ? How can the overall picture of ecological imbalance be brought to the level of individual awareness and transformed into controls over individual actions ?

Much of the controversy between applied biologists and conservationists arises from the conflict of interests, objectives and ideals between those who are charged with the control of insect vectors of disease, agricultural and forest pests and those interested in the preservation of the environment and wild life.

There is need to integrate programmes of research into pesticide control and conservation at an international level, because organisms and pesticides move from one country to another.

To stress some of the direct or indirect effects of increasing numbers of persons and their activities on their own environment, the following points bear repetition ;-

a) "Human activities may tend to upset the stability of plant and animal communities. Because human population growth affects plant and animal communities, destruction of plants and animals may lead to their extinction.

b) Destruction of forests may give rise to adverse effects, such as soil erosion and floods.

c) Agricultural land can become over-cultivated giving rise to decreased productivity and practice of mono-culture (in agriculture) is ecologically a risky undertaking.

d) Careless use of pesticides can give rise to agricultural health problems.

e) There may be hidden ecological dangers in the practice of building vast irrigation schemes. These dangers include problems of soil fertility and problems of pest growth. (Eg. Resurgence of malaria and schistosomiasis where irrigation canals are built).

f) Pollution of water by industrial and other chemical substances may destroy aquatic especially fish life.

g) Pollution of water by industrial and other materials may give rise to problems of water supply to human population.

h) Pollution of the biosphere with ionizing radiations may adversely affect the biosphere, including the human population itself.

i) The destruction of plants and the excessive burning of fuels tend to deplete the atmosphere of its oxygen and to increase the concentration of CO_2. If these tendencies incresae, all life may be endangered.

j) Air pollution is prone to occur in association with industrialization and urbanization."

Preventive measures can still be taken in developing countries where increasing industrialization and modernization are being made aware of the existence and dangers of pollution. Recognition is the first step towards the remedy of this problem for we are faced with a situation of

The generations pouring
From times of endless date,
In their going, in their flowing,
Ever from the steadfast State ;
And humanity is growing
Toward the fullness of her fate.

Herman Melville
(1819-1891)

"POPULATION ECONOMIC GROWTH AND DEVELOPMENT"

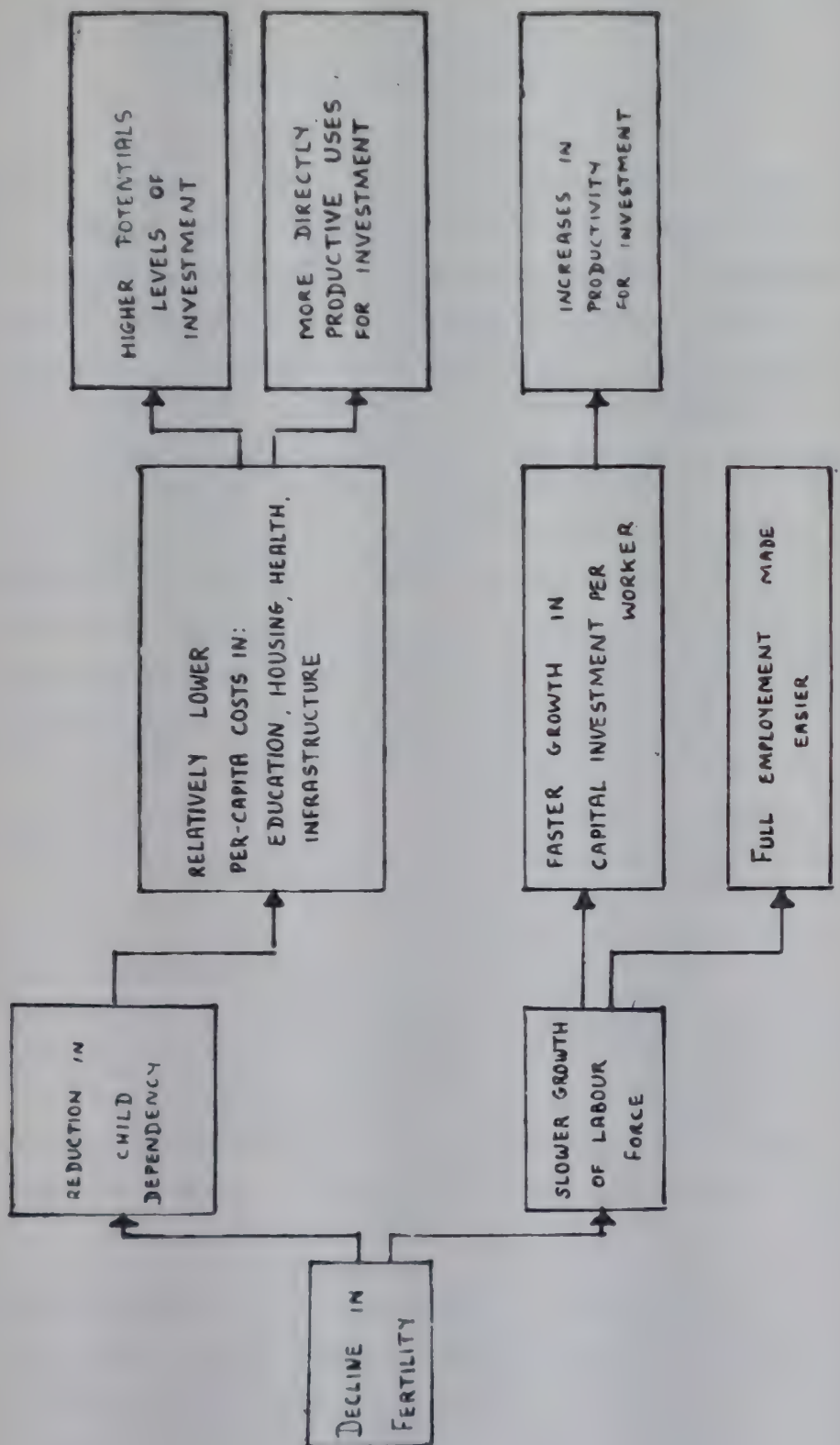
Econometrics

There is little dispute that general economic development greatly influences fertility, mortality and migration, and that it is an extremely important factor in determining demographic behaviour. It is generally agreed that broad-based economic development usually results in major declines in fertility.

But what is the nature of the reverse relationship- the effect of demographic growth on economic growth and development? A broad range of views exists - from those suggesting that ratios of population growth (whether slow or rapid) are only minor or irrelevant components of the development process, to those suggesting that rapid population growth will contribute to economic growth.

Population growth rates are determined by birth rates, death rates and migration. It is a commonly shared opinion that migration is not realistic, and a high death rate is not ethical as a policy for reducing population growth rates (although in some countries migration does play an important role in alleviating population pressure). But the attention of many social scientists has focused on the relationship between fertility trends and economic growth. The study of this relationship can be approached by the examination of past historical examples or by the analysis of economic theories and econometric growth models. There are historical cases of countries having economic growth along with high rates of population growth. Mexico and Brazil currently are experiencing high rates of both population and economic growth (although it is also argued that they are not experiencing broad economic development if such includes extensive increases in employment and standard of living). Both demographic and economic growth have certainly occurred together, but many believe that in these situations economic growth could have been greater had population growth been reduced. Historical interpretations of the relationship between demographic and economic growth differ greatly. One important scholar in the field argues that few firm historical conclusions can be drawn "because of the importance of non-economic factors not amenable to economic analysis, i.e., the broader social, political and international decisions." (Kuznets 1967).

The Figure shows the classical theoretical relationship between a declining fertility and economic growth used in the Coale-Hoover econometric growth model of India (Coale and Hoover 1958; Coale 1963). The purpose of the model is to make a quantitative estimate of the effect of declining fertility on economic growth. Although serious criticisms have been levelled at the quantitative estimates, the model expresses important relationships that should be considered.


DECLINE IN FERTILITY
REDUCTION IN CHILD DEPENDENCY
SLOWER GROWTH OF LABOUR FORCE
RELATIVELY LOWER PER-CAPITA COSTS IN: EDUCATION, HOUSING, HEALTH, INFRASTRUCTURE
FASTER GROWTH IN CAPITAL INVESTMENT PER WORKER
FULL EMPLOYEMENT MADE EASIER
HIGHER POTENTIALS LEVELS OF INVESTMENT
MORE DIRECTLY PRODUCTIVE USES FOR INVESTMENT
INCREASES IN PRODUCTIVITY FOR INVESTMENT

Some relationships between declining fertility and economic growth

An 'econometric model' is an attempt to look at the mathematical aspects (e. g. income per head) and see how this is related to factors in population growth or change, or the relationship of a decline in fertility to economic growth.

The first mechanism in the model deals with the short-run benefits of a declining fertility and its effects upon dependency ratios and investment potentials. A decline in fertility immediately begins to reduce the proportion of young dependent persons in the population. A reduction in the dependent, non-productive population frees capital that otherwise is spent for the maintenance of this population. This raises the savings and investment potential at both the micro and macro level. Not only does the potential for a higher level of investment increase when fertility declines, but capital may be put to more directly productive uses. Thus, instead of investing capital to maintain the same per-capita expenditures for social services, capital can be allocated to directly productive investments in factories, tractors, fertilizer plants, and so forth. The benefits of this mechanism are based on a decline in fertility. The model assumes the decline would level off in twenty five years. Thus, the benefits would also level off when the model reaches equilibrium, that is the stabilization of the age structure.

The second mechanism of the model deals with the long-run benefits of a fertility decline. A decline in fertility does not affect the size of a country's labour force for at least fifteen years. After fifteen years, the growth of the labour force begins to decline and more capital can be invested per worker. This can raise the capital output ratio and the productivity per worker.

Per-capita income in a reduced-fertility population can be higher because a larger proportion of the population is in the labour force ages and there is an increase in the amount of capital per worker. Whether total national income is higher in the high-fertility population depends on the productivity of the larger potential labour-force, with its smaller amount

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of capital per worker. It should be noted that a larger potential labour supply need not imply a larger number of employed workers because some may remain unemployed. One benefit of lower fertility is that it makes full employment targets easier to achieve.

The Coale - Hoover model assumes a fertility reduction without calculating costs of demographic programmes. Progammes to reduce fertility cost money, and development planners must weigh the costs and benefits of demographic investments against alternative investments. A body of literature that analyses the costs and benefits of a fertility reduction has been developed by Demeny, Enke, Meier, Robinson, Zaidan, and others. Of course, there is disagreement in this literature as to the specific benefits and the real costs of such programmes and how these should be measured as well as how to discount future costs and benefits so that they are comparable with current values.

"It is right that economics which, in fact, generally deals with questions of human welfare, should provide some explanation of the impact of population growth in :

1. *The macro-economic field* which is the impact on society as a whole, the nation as a whole, instead of individuals ;

2. *The micro-economic field* which is the economic effects of population growth on the family, on individuals. Assuming the same income and less family expenditure (due to smaller family size) the family savings could be invested by government or by family and create a higher income ;[2]

'It must also be noted however that the economic argument according to which population growth is a major obstacle to development has not as yet convinced many governments of the need to control population growth. Moreover, the argument is ambiguous and in some cases even circular, since, at least until now, the main cause of a voluntary decline in the birth rate appears to have been economic development and its accompanying cultural changes, and it is not even certain that

in a particular set of circumstances population pressure has not acted and does not still act as a powerful spur to economic development. In any event, there are situations where even over population presents a threat in which the cost of birth control calculated not only in material resources but also in human resources and more particularly in terms of the administrative cadres required for the implementation of programmes, is in keen competition with resources needed for other programmes designed to bring about a rapid increase in productivity and output. These are not hypothetical situations but ones which can be seen every day.'[3]

Macro - Economics - Economics of a whole country i.e.

1. National Income
2. Investment
3. Saving
4. Capital Stock
5. Capital Output Ratio.

A Capital Output Ratio of 2½ would mean that the value of the C. O. Stock is 2½ times that of the stock produced in a year. It is high in sophisticated producing countries and low in agricultural producing countries. It is a theoretical tool.

6. Labour
7. Consumption
8. Productivity-Technological Innervation

All econometric models leave out the human factors and how they can be affected by different changes, as many things are kept constant, only the population factors are changed, so there is no emperical justification. Moreover, all these models have been produced by demographers who believe that rapid population growth is a serious handicap to economic growth. There is neither a type of model to prove the opposite nor any substantial subjective or quantified work.

The economic advantages of a reduced birth rate can only be seen over a period of time. Very often the shortage of skills is sometimes very critical and therefore more important than the shortage of capital in a developing country.

Of equal importance is the intelligent allocation of finances available, which must be relevant to and in proportion to the needs of the country.

Most economists think it is economical to reduce the Birth Rate even if one has to spend on it. However, Demeny in his work brought out the fact that Family Planning programmes cost a lot and the reduction of the Birth Rate can be an expensive project in certain countries or situations.

Most of the models assume full employment and are very optimistic and assume that labour and capital is equal which is not true.

Also most of the models are very pessimistic about the improvements that may come from technological gains or change.

Micro Economics

In terms of Family Planning programmes Enke was trying to determine the benefits of the Family Planning programme to a community. He defines Benefits as the production from an individual and Costs as the consumption by an individual. The benefits of the birth of a child are what it gives to the community and costs are – what it costs the community from the period of birth and over its lifetime.

If costs exceed the benefits, then it would be better to prevent that birth. All costs benefits studies are about the future. When Enke applied his theory a great excess of costs over benefits was found. The benefits from production came about 20 years ahead in the future.[4]

In any country the ultimate aim of National Development be it economic or social is presumably to improve *Quality of life* of the population. This refers to both the material and non-material aspects of life and encompasses all the goals which a family may be expected to try to achieve.

An adequate standard of living for individual families needs :

Provision for the maintenance of health and for the growth of children.

Addition of some conventional goods to enable the family to live as others do.

Facilities for education and recreation.

Provision for the future.

Accomodation to sleep, cook, eat and rest as a family in a unit. Disposal of refuse/waste. Water supply, Recreation.

Every child has the right to be wanted. Parents should be equipped adequately both physically and mentally to have children.

Family Resources

Family Resources are of two types :

(i) Human Resources

Time, Energy or Health. Ability and skills. Knowledge, interests and attitudes.

(ii) Non-Human Resources

Wages, incomes, savings, material possessions. Land and its produce. Community facilities.

There are three important points to realize concerning Resource.

1. The use of Resources determines the kind of life an individual or family has.
2. All resources are limited but can be developed.
3. The uses of all resources are inter-related.

In some societies there is very little appreciation of the fact that the individual, or the family, has the power to change his way of life and can use resources to gain the goals he values.

An individual cannot grasp the fact that family size can affect his standard of living and the whole quality of life for him and his children now and in the future. He needs to be taught about his resources and how they can be developed. *He needs to be taught to plan.*5

'Massive adoption of new ideas on family size accompanied by action translating these new ideas into reality is inconceivable without a massive break through in spreading and strengthening patterns of rational economic behaviour ; in inculcating and reinforcing the idea that individual action can improve one's economic status ; in effecting favourable changes in economic mobility, initiative, risk-taking, and economic calculus ; in promoting modern attitudes on child rearing and education ; in raising aspirations and goals of achievement for the individual, his family and his children ; and in changing many other aspects so that in that truly great transformation in human life — lower fertility and growth was tightly bound into the realization of many of the economic and social goals with which we began.

However, a clear set of threshold factors in whose presence the fertility transition begins and in whose absence it does not is yet unknown.

According to Coale's comprehensive study of the Western transition there are : "three general prerequisites

for a major fall in marital fertility... (1) **Fertility must be within the calculus of conscious choice.** Potential parents must consider t an acceptable mode of thought and form of behaviour to balance advantages and disadvantages before deciding to have another ichild. (2) **Reduced fertility must be advantageous** : Perceived social and economic circumstances must make reduced fertility seem an advantage to individual couples. (3) **Effective techniques of fertility reduction must be available.** Procedures that will in fact prevent births must be known and there must be sufficient communication between spouses and sufficient sustained will, in both, to employ them successfully.[6]

The Value of a Prevented Birth

Economically speaking, the birth (or conception) of a child may be considered the beginning of an investment period in which resources are absorbed in child rearing. This is followed by a productive period in which a positive contribution is made, and then by the dependency of old age. If all of these can be summed up, then we would have a measure of the economic value of a birth. Should it be true that the population of a country is growing too fast from an economic point of view then it should also be true that this value is negative, that an additional birth represents a loss, and that the prevention of a birth therfore has a positive value.

There are two basic problems involved in calculating the economic value of a birth :

1) In the first place, one must compare future and present values. If there is a certain life-time pattern of consumption and production, then all this consuming and producing at different times must be reduced to its present value. For a number of reasons which are not entirely binding, it is customary to do this by discounting at some constant rate. Even if one accepts this procedure the question is which rate is appropriate, and this choice will make an enormous difference in the capitalization of a

life. Of course, survival chances must also be taken into account, but that presents no great problem.

2) The second difficult question concerns the pattern of consumption, and production. One might be tempted to define consumption levels at different ages as some sort of subsistence requirement, and consider any production in excess of such levels as a surplus. This would be appropriate in a slave economy, but is is not adequate in a household economy where by and large the consumption of children and adults increases pari passu with their incomes, unless income is taxed away. Production is even more troublesome. Obviously the average life contains a period in which individuals earn more than they consume themselves ; this enables them to support the young and the aged. But we must be concerned with the marginal man with one additional birth, and it is then the marginal product of labour that matters as we try to assess the social costs and benefits of a birth. To make things worse, it is the marginal product of labour in a remote period in the future.

Stephen Enke has tried to estimate the negative value of an additional birth in a country like India. Assuming that the discount rate was of the order of 10 or 15 per cent, he has shown that the present value of the consumption of infants and children adds up to very large amounts while surpluses from the productive period of life do not come to much. If one believes that the marginal product of labour is zero, then the value of a new birth is obviously negative and consists of nothing but discounted consumption costs. But even if one does not believe that the marginal product of labour is zero or will be so 15 years from now, which is the important thing, almost any productive surplus in adult ages will be reduced to very little if it is discounted at 15 per cent. At that rate, an income earned at the age of 30 is reduced to a present value of 1%.

The curious implications of this may be clarified by an example on very simple assumptions. We may ignore mortality altogether and simply suppose that a child involves a constant annual expense until the age of 15, and the same constant subsistence until the age of 65, with the difference that between 15 and 65 it makes some constant positive contribution. At 65 everybody dies. On these assumptions, it would be necessary to produce, in the productive age period, an annual amount almost exactly ten times as large as annual consumption requirements merely to make the capitalized value of a life equal to zero.

But in such a population there would be about 77% producers, if the population were constant, and 59% if it were growing at 3% per annum. If the marginal product were as much as ten times the subsistence requirement, then, even if the average product were no more than the marginal, such a population would yield a spectacular surplus. If it were constant, its total output would be almost eight times as large as the subsistence needs : Still it would by the Enke criterion be just at the point where it might find the value of a birth negative.

The reason is that the present value is a meaningful concept only by comparison with some alternative use of resources. If the discount rate is thought of merely as a measure of time preference, which is assumed to be very high in poor countries, then the present value of all investment projects which cannot show such returns will be negative. If the discount rate were very high, all investments, whether in future population or in capital equipment, might have a negative value in comparison with current consumption. By the logic of the argument no investment should then be undertaken. However, if investments are in fact undertaken, there is a case for setting the discount rate at the level of the marginal rate of return. If at that discount rate, the present value of a prevented birth is positive, this simply means that the resources spent on rearing additional children would be more profitably employed in some other type of investment.[7]

The concept of discounting is a major problem to measure in any given case. In developing countries interest rates are very high, but if you saved on children's births the benefits used in other investments like factories etc. might not be very high. Even if you lower the interest, you still tend to get a smaller deficit of benefits. This is a controversial point.

Some economists like De Mayne object. He holds that the formulation of benefits in terms of production is not a general one. There must be non-monetary benefits from children, because besides producing goods or being economically profitable, children bring satisfaction and are necessary for the development of the individual. Parents are willing to pay for having the satisfaction of having children. Therefore, though it cannot be measured "satisfaction" is an important economic consideration.

In a pioneering study by Frank Lorrimer- ("Economics of Family Planning") he considered the Production-Consumption Benefits over time to a family, comparing the impact of different situations.

I Agrarian with High Fertility and High Mortality

II Agrarian with High Fertility and Moderate Mortality

III Industrializing with High Fertility & Moderate Mortality

IV Industrializing with Moderate Fertility & Moderate Mortality

A major conclusion of his study was that :

III - Industrializing High Fertility and Moderate Mortality was a great burden or made big demands on the family.

II - Agrarian High Fertility and Moderate Mortality did not make such big demands on the family's economy because by 14-16 years children in such an agrarian community can make a big contribution to the family economy.[2]

Suppose one starts with a situation in which fertility and mortality are both high, population is stationary and production, consumption and leisure follow traditional lines. Consider now the life cycle of a typical family. There will be certain characteristics, patterns of marriage, childbearing and mortality. Associated with the varying number sex, and age of family members during the life cycle, there will be too a normal pattern of family consumption requirements, on the one hand, and productive contributions on the other. In a situation where population is stationary productive contributions would be expected roughly to balance comsumption requirements.

How would the balance between production and consumption be affected if mortality rates declined and everything else remain unchanged ? If the decline is of the usual kind, there would be more living change during the early years of the family life cycle, consumption requirement would be raised and the balance of production less consumption shifted in a negative direction. Later in the family life cycle, there would tend to be a compensating rise in production as the added change reached production age. But during the family's main reproductive ages, the ones in which, so many vital household decisions are made, the addition to consumption requirements would outweigh that to productive contributions, resulting in incressed economic stress. Moreover, if, as is sometimes suggested, the conditions which reduced mortality also raised fecundity, this stress might be aggravated by a rise in fertility as well.

Paul Demeny studied "The Values of Family Planning to the Community". 'Very often a reduction in population or population growth rate would be advantageous to a community'. He starts with this assumption and with the argument that families will act with regard to their economic advantage and will adopt family planning if it is really to their advantage. He says a good case can be made for the State if it

provides family planning services for the people to use, because it cuts costs if the state provides it on a large scale.

But the communities' need for family planning and the families' need for family planning may clash with the government's interest in reducing family size, for the benefits to the family from not using family planning and having a big family may not be apparent to the State. The economists call this Externalities. Also a rational decision of the families may not be for the good of the community.

Not much is known of the extent to which externalities affect the family in a typically rural agrarian society as in India.

In all this the relationship between the State and the family tremendously affects the decisions of the family with regard to family planning especially as to what services the state pays for schooling, health, etc. The economic decision of the family, and the economic decision of State is very often different and very little is known about the effects etc. of these especially as costs are borne by the family or community or State partly or fully.

It is finally apparent that the "Economic Motive" is an important consideration, but many factors cannot be measured on a monetary scale and are still very complex and important.

Regarding Capital Investment in models; it usually holds that when population growth is fast you have to invest more. Developing countries like India, Turkey, Chile and Egypt who invested in huge industrial plants and imported expensive machinery for them, found themselves accumulating large balance of payments usually involving payment in hard currencies. Comparatively, tourism is an industry which is a 'painless way of improving Foreign Exchange Balance'.[10]

Population and Economy

Ohlin considers relations between population growth and economic magnitudes. Ohlin is dissatisfied with the state of theory. The source of his disquiet is what he considers an ambivalence in the treatment of labour versus capital — labour is not regarded as a man-made resource whereas capital is. He suggests, however, that "if the hypothesis that fertility is largely determined by economic factors is to be taken seriously, it means that labour is a man-made resource". Although he admits that "people want children and get them for a great variety of reasons, many of which we probably do not begin to understand", Ohlin proposes, nevertheless, to adopt a view of propagation as an investment process, and "to consider the implications of a generalized concept of capital which would include human resources" as well as non-human.

If population has ever been economically beneficial we would expect that the capital value of a human being at birth must sometimes have been positive.

It is this issue, of the conditions under which the capital value of a human being at birth is positive or negative that constitutes the centre of attention in the paper.

A human being viewed by analogy with physical capital, absorbs certain inputs (consumption) and yields certain outputs (production) during the course of his life cycle. Given the pattern of production by age, and similarly for consumption, the *capital value* of a *human being* may be defined as the excess of the discounted value of output (production) over input (consumption), after allowing for the probability of survival to each age.

By his analysis Ohlin confirms that empirical estimates of the value of births or prevented births will be very sensitive to the rate of interest. Nevertheless, whenever rates of interest are more than a few percent higher than the rate of growth of the population, the present value of a birth is likely to be

negative. On the other hand, it is clear that if rates of return to capital are very low, investment in people may be preferable

Ohlin points out that "if it is a matter of deciding whether the rate of growth of population is 'optimal' the value of a birth is a very different criterium from that of a maximized rate of growth of income per head", let alone, one may add, a criterion of maximum family welfare.

Ohlin proposes "to define population pressure in terms of the relationship between population and the capital stock" specifically as "an unfavourable ratio between the rates of increase of human non-human capital." This conception is essentially a variant of the "optimum population" approach with the implicit goal of society shifted from maximum per capita income to maximum non-human capital accumulation. A serious shortcoming of such concepts, it seems to me, is that they are formulated solely with reference to an aggregate called "society" and their meaning in terms of the units which actually comprise society is not clear. Yet if "population pressure" alters production consumption, for demographic conditions in "society", it must work through the individuals and families whose behaviour and experience change in these respects and "population pressure" must have meaning in terms of the experiences of these individuals and families.

This line of reasoning leads to a view of population pressure as an adverse change due to population variables in the balance between consumption requirements and normal productive contributions during the prime reproductive ages of the family. Might there not be merit in exploring such a concept? It is quantifiable — Lorimer's study points the way in this respectes — and lends itself to differentiating among varying intensities of population pressure. It reflects both consumption and production implications of changing vital conditions. It is formulate in terms of the experience of the units in the society which are affected by and, in turn respond to these changing conditions.

Finally it leads readily into systematic consideration of the variety of possible responses — in demographic, consumption and production behaviour.[9]

Gunnar Myrdal, perceived snags in the theory that a lower "dependency burden" inevitably gives rise to a higher rate of "physical" investment in economic growth. The only certain and immediate economic effect of a decline in fertility, he admits, is a higher level of consumption, which is an intangible human investment. In countries where consumption levels are very low, more consumption means better nutrition, and health, capacity to work longer and harder, inclination and opportunity to acquire skills - all very essential for economic growth.

Myrdal's thesis applies to a 'very low level of consumption', a level that prevents a producer from making full use of his energy or acquiring necessary skills. The question that needs to be answered is this : is population control the only or the easiest and quickest method of rising above this level ? Have not many countries crossed the 'very low level' mark only by bringing in institutional changes and making small techno–logical improvements ? If we must wait for birth rates to drop before expecting to cure malnutrition, sickness and lassitude, perhaps we should withdraw from all other efforts for social development.

When faced with this question, the population theorist cannot help disclosing his political cards. Despite frustrations and failures population control ventures are presented as substitutes for supposedly harder changes.

What Dudley Kirk says, represents a widely shared attitude :

"Family Planning programmes may be easier implemented than major advances in education or the economy, which require structural and institutional changes in the society as

a whole. The decision whether "structural and institutional changes" are possible or not, lies with those who bear the responsibility or suffer the consequences, not with experts.

Theoretically, a small family should enjoy a a higher standard of living than a large family if the two have the same income. Limiting the size of the family can therefore protect an achieved standard of living. Who would, however, seek this security if he found himself defenceless against innumerable other sources of insecurity ? People who try to plug leaks in the roof must be reasonably sure that the roof is going to stay. Family planning does not guarantee that the roof will stay. In provides no answer to pervasive anxieties : jobs that disappear, crops that fail and surpluses that cannot be sold and must rot.

Equal opportunity to compete-the promise held out by many modern social systems-may also create an indifference to family size. It would appear sensible for a person of average means to prefer a better-cared-for small family to a poorly-cared-for large family. Nobody, however, believes that he is an average person when he is constantly told that there is room at the top. People cannot think statistically about their chances in life when they are caught in the uncertainties of a highly competitive existence.

It is equally unreal to expect social groups to influence personal decisions on child bearing, if they do not share the responsibility for those born. As long as more children create problems only for their own parents or for planners in distant ministries, the "dependency burden" cannot become an object of social concern. *A population policy can become a social reality only if the responsibility for the young is shared within smaller units of living where people are visibly affected by each others fertility and live close enough to influence each other's behaviour.*[12]

The Economic Implications of Growth

If the idea of the existence of a maximum population seems very obvious, the concept of a minimum population is rather less so and the biological factors leading to a minimum level, below which a population is bound to disappear, are as important as the economic factors. First there is the risk that it will be impossible to conclude marriages among very small populations. because of thc limited scope of matrimonial combinations (at least in a monogamic society). There is also the high degree of consanguinity implied in such a situation with a resulting low fertility rate and high death rate.

In fact, the economic arguments in favour of there being a lower level for the population seem to be less imperative in primitive economies, such as those, for instance, which depend upon the simple gathering of food. It is the division of labour, necessary for the various functions permitting certain standards of well-being, which requires the population to remain above a certain level. And, conversely, we can see, in the most developed countries, the appearance of considerable concentrations of humanity to satisfy the greater diversification in the production of goods and services.

In demographically stationary conditions, where births and deaths balance each other, and the population remains constant, the fraction of the wealth of society assigned annually to the education and integration of young people into the cycle of production does not involve other expense than that of renewal (with possible improvement) of the apparatus of production in its broadest sense (factories, materials, schools, teachers), in short the writing off of the capital employed. The demographic factor appears as a neutral element in this context.

When we come to conditions of growth, we are faced with quite different problems. Let us suppose, for instance, that a population increases by about two percent every year; the

maintenance of the same standards of living in this growing population requires a similar growth of productive capital, growth of the population alone not being enough to produce the supplementary goods needed. The increase, in productive capital, necessary to cope with demographic growth demands real investments in addition to those required for the renewal of existing equipment. These investments are called demographic investments.

One measures the size of the investments required for an increase in production by introducing the concept of a national rate of interest. A rate of 25%, for example, means that an increase of 100 in the productive capital corresponds to an increase of 25 in the annual production. One can also speak of a marginal coefficient of capital, which is 4 in our example ; that is to say, in order to achieve an annual increase of 25, the investment needs to be four times greater. The numerical example chosen corresponds more or less to the accepted rate of interest on current investments. A demographic growth rate of 3% common in developing countries requires similar increase in production, i. e., an investment to cope with purely demographic factors four times higher or 12% of the annual produclion.

TABLE : RATE OF GROWTH (1958 – 63)

	Population Growth	*Per Capita Gross Domestic Product**
	(per cent per per compound)	
Developed Regions	1.3	3.4
Developing Regions	2.5	1.8

Gross National product is the value of total annual production of goods and services supplied by all 'normally resident' individuals, firms and government bodies. If 'income' is restricted to income derived from participation in produetion GNP also equals the annual sum of their incomes, including net income from abroad.

Gross Domestic Produot...Equals GNP minus net income from abroad

41 COMMUNITY HEALTH CELL
47/1, (First Floor) St Marks Road,

"In terms of adult consumption (excess of population over consumption), saving varies from 23-2 per 100 persons when the demographic growth rate is 2.3% to 39.2 when the population is stationary."[13]

if the population is growing each year by	*A country must save ann invest each year at least*	*In order merely to*
1 percent	3 percent of national income	Maintain per capita income unchanged—meaning on improvement in the average living levels
2 percent	6 percent of national income	
3 percent	9 percent of national income	

This could be called demographic investment in Sauvy's sense. Obviously, only savings *in excess of those required to sustain a growing population at existing levels* can be used for investments that will increase per capita income and improve levels of living. Thus, *economic* investment would be:

If the population is growing each year by	*A country must save and invest each year at least*	*In order to achieve an annual increase in per capita income of*
2 percent	9 persent of national income	1 percent
3 percect	15 percent of national income	2 percent

Less-developed countries are, of course, able to supplement their domestic savings with foreign capital imports, most of which reach them in the form of long-term capital investment made by governments, international organizations, and private business. Foreign exchange transfers also occur in the forms of grants, technical assistance, and concessionary food (under the U. S. Public Law 480 Program and the World Food Program). Although developing countries provide 80 percent of their capital investment resources themselves, the 20 percent supplement of foreign resources that is needed is crucial and has often made all the difference in the increase of the annual economic growth rate.[14]

Thus, when there are conditions of demographic growth, the standard of living tends to fall, owing to the need for increased demographic investment, coupled with the diminishing possibilities of saving.

The arrival of numerous children presents an obstacle to the economic participation of the woman, while conversely, such participation is easily possible with a limited family.

But this analysis of the advantages of a perfectly stationary population is too one–sided. In fact, this is hardly an optimum situation and a certain demographic dynamism, as long as it remains within moderate limits without creating excessive burdens from growth, presents certain advantages. The most obvious of these advantages lies in the increased rate of renewal of the population ; the use of population models shows that if a population is stationary, the annual contribution in new workers of the working generations can be esttmated at 2·3%. This new section of the economically active population exactly replaces the aged, the deceased and the retired. If, however, the population grows at the rate of 1%, the annual contribution of the younger generations to the economically active population becomes almost 3%. In addition, these new elements are much more mobile than their elders who are already engaged in a single activity. During periods of intense economic progress and the subsequent structural modifications in the economy, corresponding modifications in the division of labour must be coped with. One man can cite, for example, the decline in the agricultural population and the expansion of vital industries. All this permits an increased contribution on the part of younger elements of the population who are directed towards expanding occupations, disposing of more skills than would be the case if workers in other specialised occupations were retrained.

Although the stationary population usually includes a greater proportion of persons of active age than a

growing population, the total of the active population is older, since, the younger elements, those below 40 years old for example, form a smaller proportion. This increased degree of ageing entails a qualitative depreciation caused by the decline of physical and mental powers with the advancement of age. It is no longer certain that, in respect of their active elements, the population showing moderate growth are everywhere at a disadvantage in relation to stationary population.[15]

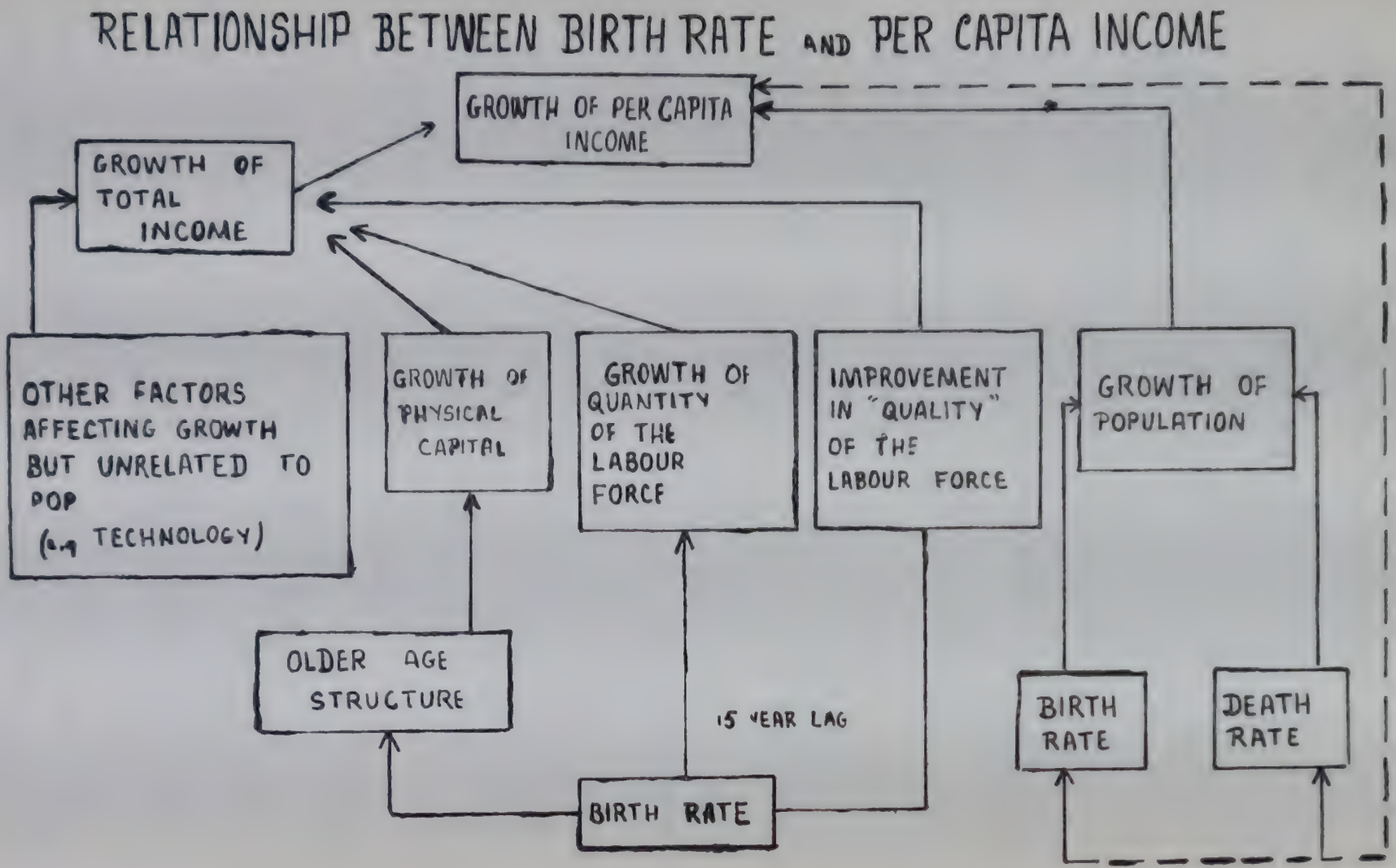
The following figure attempts to reproduce in simplified form the mechanism through which the model applied to India (and Mexico) works. This shows that a reduction in Birth Rates affects the rate of Growth in per capita income by (1) Reduction in Fertility leads to a smaller total population (2) via accumulation of capital, which is assumed to increase because a reduction in fertility will lead to a much smaller proportion of children (who are the dependent population). (d) via the Growth of the Labour Force (proportionately the number of persons in the L. F. would increase over 15 years.)

This figure is based on the work of A. J. Coale and E. M. Hoover "Population Growth and Economic Development in Low Income Countrie : A Case Study of India Prospects (Princeton & Univ. Press 1958).

PROPORTION OF GNP that has to be Invested in order to keep per capita Income at a Constant Level in Various Countries

Over 10%	Colombia India Morocco Brazil Ghana Tunisia
7.5 — 10%	Malaysia Peru U.A.R. Thailand Mexico Phillipines Turkey
5 — 7.5%	Sudan Pakistan Nigeria Indonesia South Korea Chile Ethiopia
Less than 5%	United States Norway France Sweden Denmark Finland West Germany Italy United Kingdom Belgium Austria Greece Portugal

Note : Population Growth figures are for 1967. The incremental capital-output ratio is for the period 1960-65. Countries included are those that had the necessary data, and they are classified in descending order. (By George C. Zaidan from Studies in F. P. No. 42, May 1969.)


RELATIONSHIP BETWEEN BIRTH RATE AND PER CAPITA INCOME
GROWTH OF PER CAPITA INCOME
GROWTH OF TOTAL INCOME
OTHER FACTORS AFFECTING GROWTH BUT UNRELATED TO POP (e.g. TECHNOLOGY)
GROWTH OF PHYSICAL CAPITAL
GROWTH OF QUANTITY OF THE LABOUR FORCE
IMPROVEMENT IN "QUALITY" OF THE LABOUR FORCE
GROWTH OF POPULATION
OLDER AGE STRUCTURE
15 YEAR LAG
BIRTH RATE
BIRTH RATE
DEATH RATE

RECOGNITION OF POPULATION PROBLEMS IN DEVELOPMENT PLANS, BY REGION, NUMBER OF COUNTRIES, AND TOTAL NUMBER AND PERCENT OF COMBINED POPULATION [16]

Region	*No. of countries*	*Combined population (million)*	*Percent of combined population*
Total Study			
Recognition of population problems in development plan	27	1,126	71
Africa, Asia, and Latin America : combined study	70	1,589	100
Africa			
Recognition of population problems in development plan	8	121	48
Regional Study	26	254	100
Asia			
Recognition of population problems in development plan	12	969	91
Regional study	21	1,065	100
Latin America			
Recognition of population problems in developing plan	7	36	13
Regional study	23	270	100

Taking into account, the effects of population growth on economic development in India from 3 aspects :–namely,

1. The size of the population
2. Its growth rate
3. The age composition,

the relationship between population size and per-capita income has been of much discussion and is closely associated with the theory of Optimum Population advanced by Cannon and other writers. Cannon defined optimum as a

population that was moving in the right direction with respect to the increase of output.

"The right movement is that which will give the largest returns to industry in the long run, the interest of the people of all the generations being taken in to account." This implies that if the population is too large then a negative growth or a decline is essential for increasing per capita return. However, if the region is sparsely populated then for increasing the return population growth is an indispensable condition – Optimum population theory in principle is an exercise in comparative economic statistics, the nucleus point being the welfare of the society measured through the mono-scale of per capita income under 2 opposite forces in work.

The question whether a country is over populated i.e., the given population is larger than one yielding maximum per capita output is extremely difficult to solve. As is well known, the relationship between economic growth and population size is not so simple. A country at a particular point of time with a given population may actually be in a state of decreasing returns, but with better quality of labour force and improved methods of production the same population size may be the optimum size or even fall short of the optimum requirement. Therefore, the ratio of output to population size depends upon the state and the level of the development of the country.

The most common defect which is involved in analysing the impact of population growth on economic development is that in many cases the whole emphasis is put on the size of the population and little or no consideration is given to its rate of multiplication. A higher growth rate(mortality remaining unchanged), implies a higher annual birth rate or a higher frequency of births per female. It is evident that in areas where the incomes are low and inelastic, the welfare of a family is closely linked with its size. In such a situation, generally a smaller family can ensure greater comforts, better up-bringing of

children and less domestic strain on the over-worked mother. A negation of these, either a few or all, may abate the family happiness. To elaborate, the health of the mother is likely to suffer if many children are born at shorter intervals. As a result of excessive demand on mother, the children are likely to receive less guidance, protection and health care. A large family may also stand in the way of educational achievement and this may affect adversely their future prospects which are definitely more bright if they are well educated and adequately trained.

Moreover, a bigger family may be the cause of the subdivision and fragmentation of the family holdings eventually leading to uneconomic size and may compel the children to leave their homesteads in search of jobs and very possibly to join the rank of unemployed.

In view of these drawbacks a substantial number of enlightened parents in less developed countries feel that the emotional satisfaction derived from having an extra child is more than outweighed by its disadvantages. In a number of Asian countries the survey results have shown that typically two thirds or more parents with 4 or more children and a quarter or more with only two children say that they do not wish to have any more.

From the public or the national stand point a modest rate of population growth is beneficial for the economy of the country. The significant feature is that a higher rate of population growth implies a higher level of investment to achieve a per capita output. Assume that there is no change over the short run and that capital and labour form the only ingredients of output. Then if the population and capital stock is increasing by the same rate, the rate of output would remain unchanged on per capita basis. Particularly when the supply of capital is inelastic and meagre, a higher rate of population growth per force would require a diversification of investment from capital formation to consumptive ends for retaining the existing level of living. Thus from the consideration of the country's economy in developing

areas a slower rate of population growth is preferable to a rapid growth.

The third factor which is of consequence in analysing the effect of the population growth on economic development is the age composition of population which in turn is strongly influenced by the elements that determine the rate of population growth.

Due to 40% of the population being under 15 it emanates that the burden of dependency is higher in developing countries than in the developed countries. Consequently in developing countries an average family cannot spend the same amount of money on each child as a family of the same status can spend in the developed countries. Further, when the income - disparity between the developed and developing countries is taken in view, the difference is apalling.

A particular aspect which deserves some elaboration is the relationship between mortality reduction and wasteful consumption. The term 'wasteful consumption' here is used in a restricted sense and signifies the cost of up-bringing the children who eventually die without contributing to the wealth of the nation or the family i.e. those dying before the age of 15 years. It has been illustrated that out of an initial cohort of 100,000 births which is exposed to relatively higher mortality rates, 25784 children die before the age of 15. But when the same cohort is exposed to a lower mortality schedule, the number of such deaths is restricted to only 18,337. However, if this number is converted in terms of 'years survived' the reduction is from roughly 55,000 to a little over 30,000 years. Thus by comparing the number of years survived in two populations it may be deduced that the expenditure incurred on unproductive children in populations with higher mortality would be roughly 1.8 times of that in the populations with lower mortality rate.

On the side of the implications, decline in mortality unaccompanied by a corresponding reduction in fertility has far reaching consequences.

It has also to be kept in view that in an area like rural India it is the level of mortality and not the fertility which determines the size of the family in the sociological sense of the term. The point under consideration has been best illustrated by Collver who through his survey showed that although the completed family size of his sample couples was 6.1 children, the *maximum* number of living children in the family never exceeded 5.4. This was considerably less than what one would have found for a period of several years if mortality were minimal.

It is a fact that a decline in fertility is in a number of ways conducive to the formation of capital, both at the individuals as well as the Government ends. An important point of reference here is that a reduction in fertility would not only release more resources for investment but it will also favourably change the nature of investment. It can be seen that under the changed circumstances the Government can invest more on the productive items like factories, agricultural development and machinery, instead of on the basic facilities normally provided by the Government such as schools, hospitals, electricity, roads, etc.

Labour - Manpower and Employment

Labour— A decline in fertility will have little effect on the supply of labour for 15 years or so because the children born during the period of declining fertility will not begin to enter the labour force until they have reached approximately the age of 15. After that point the labour force will begin to grow less rapidly than it otherwise would have done. Moreover, since it would be easier to raise the percentage of young people attending school when fertility is declining, the entry of young people into the labour force in such a population will tend to be delayed. This would act as an additional factor for a slower growth of labour force under declining than constant fertility.

A decrease in the labour force will not affect productivity. Rather, a declining in fertility, by reducing the burden of dependency and by enabling the children to have better education, would improve the quality of labour and thus enhance the productivity.

An important implication which accompanies the growth of labour force is that a higher rate of growth implies a higher level of needed investment to achieve a given per capita output.

The faster growing labour force, especially in the Indian circumstances, is not beneficial for boosting the savings to finance the needed higher level of investment which would be necessary to keep productivity from declining and just to support the growing labour force. Therefore, an expansion of the labour force is not conductive to growth of per capita productivity. On the other hand, when the problems of unemployment and under-employment have to be tackled within limited resources a construction of labour force is preferable to indiscriminate growth. However, an economy where additional labour force can be settled on empty lands is a partial exception to the above line of reasoning. But in the Indian context the scope of settling growing labour force in new or virgin lands seems to be very much limited. Consequently for keeping the growing labour force fully employed, the capital stock must increase at a rate parallel to the growth of labour force, if the productivity level is not to decline.[17]

Rights and Welfare aspects

The desire for planned parenthood grows in proportion to the improvement of the economic living standards of a country, whereas we are convinced, and experience shows too, that we cannot raise the economic and cultural level of a country by planned birth propaganda.

We know from our own experience that the vital need for a country to overcome her backwardness is

industrialization; it is the condition of all her further development and also the condition needed to arouse interest for planned parenthood. This is the reason, for instance, why we follow with such keen interest the endeavours made to find funds in the frame of the U.N.O. for the development of under-developed countries.

We are confronted with a growing tendency to use science and technology against mankind, to misuse the new possibilities to take control over the natural forces—and to produce much more sophisticated manipulation with the power than ever before. In the light of these tendencies the only direction to be taken is to strive for such a position of the individual as a human being and as a citizen to control the use of science, for the well-being of mankind and not against it. The dilemma, science-human rights, has to be overcome by an unprecedented effort of the progressive forces to create the democratic social system in every country and in the international community as a whole.

The information and education to responsibility in sexual relations has to be an integral part of the preparation of children and youth for life. The pre-condition to exercise the right to free and conscious parenthood is the existence and the access to the services which enable every individual to separate sexual relations from procreation.

In this respect, the right to planned parenthood should not be mixed up with the right to abortion. By its nature abortion could be looked at as a way out of the situation where the freedom to decide before pregnancy was not use.

It is generally recognised that couples will not limit their fertility, regardless of the quality of the contraceptive technology available to them, unless they wish to do so. It is not by chance that the elaboration of human rights in the U. N. followed the course of asserting these rights in the context of a country's economic growth and social change.

Coming to the question of the role of non-governmental organisations in the field of promotion of planned parenthood, one must underline the central approach i. e. that planned parenthood should be promoted as a human right in correlation and dependence on the promotion of other human rights and is deeply linked with economic and social changes.[18]

Population Change and Development in Manpower, Labour Force, Employment and Income.

It was observed that, with a projected growth of population in the ECAFE region from about 2,000 million in 1970 to 2,500 million in 1980 and to 3,700 million in the year 2000, there was likely to be a demand for 1,000 million jobs by the end of the century. About 75 % of the population lived in rural areas, but even with an estimated decrease in that proportion, the numbers would increase by about 286 million by 1980.

Although the ECAFE region was characterized by an abundant *labour force*, with much unemployment and under-employment, there was an insufficiency of certain kinds of labour needed for economic development.

Certain conditions, such as geographic distribution, problems of malnutrition and bad health, might be cited as affecting the availability of labour. They related to productivity as well. Moreover, the level and content of education and of skills were important factors in the availability of labour. Attitudes toward work, the "work ethic", were not always compatible with the requirements of modern industrialization. Choice of occupation was sometimes governed by ethnic group affiliation that might introduce rigidities into the occupational and industrial structure and thus retard development. The widespread prevalence of such work as street-hawking which did not contribute to economic development of the nation or sufficient income to the worker, was often a problem. Effective utilization

of labour was related to cultural transformation, and incentives to facilitate and direct the process as it related to employment needed to be included in programmes with particular reference to the traditional sector. Suitability to the culture, ideology and the economic system had also to be taken into account.

Ways to increase work motivation might involve improvement of health and nutrition. Increase in the variety and characteristics of consumer goods could also be a contributing factor. A social consciousness might be encouraged during childhood that would widen the concept of purposes of work.

Conflicts of interest arising from the heterogeneity of people within countries was becoming more evident. The demands of minority groups for equality in job opportunities that affected labour utilization required attention.

It was noted that the extent of resource allocation for various levels of education might be examined. In some instances, it seemed that allocations to higher educational levels were too great and training for intermediate levels was relatively neglected in proportion to the needs of the country. That added to causes for under-utilization of labour, and the effect might be manifested in social and political unrest. The need for balance in providing educational facilities appropriate to levels of development and to plans was emphasized.

Labour demands would be stimulated according to the kinds of industries that were developed. At the outset of development, it was well to choose labour-intensive industries. While capital intensive industries might be chosen to contribute to national income, labour-intensive industries were needed to absorb the unemployed and under-employed. A suitable mix had to be found. A slow-down in population growth could greatly simplify transfer of the labour force from the traditional to the modern sector as it would decrease capital inputs necessary to bring about that transition.

It was suggested that a common market for Asian countries would contribute to a better balance in industrial development and demand for labour. The developed countries could help by adjusting their trade policies, increasing capital inputs in developing countries, and undertaking joint enterprises and manpower missions.

The difference in female age-specific labour force participation patterns between more and less developed countries was noted. In the more developed nations, there was a decrease in age participation rates of women after the age of 22, with an increase beginning at about the age of 35 and reaching a high rate at the ages of 40 to 50. In the less developed countries, there was a gradual uninterrupted trend of decline. The evidence that entrance of women into the labour force decreased fertility was as yet inconclusive. Where entrance of women into the labour force caused a delay in marriage, fertility might be lowered.

Policies on urbanization as they affected manpower utilization were considered. While urbanization in the developed countries accompanied growth in productivity, in the developing countries it had proceeded without an adequate economic base.

Urban growth had been intensified by the influx of refugees, by rapid mortality decline and continued high fertility, and by push from the rural areas without genuine urban economic pull. There was a need for balance in urban-rural development.

Government improvement of rural conditions and the provision of employment opportunities, particularly where there was a seasonal agricultural pattern, would be useful. The development of tourism could be used to bolster handicraft production and to aid rural employment.

Migration could also contribute to equalization of income. Achievement of more equitable income distribution would generate more consumer demand and therefore more job opportunities. Special training for an approved entrepreneurship was one way by which Governments could assist in improvising income distribution.

Recommendations for research and measurement of the work force should start with recognition of the inadequacy of the present labour force concept in developing countries. While it might have been applicable in the industralized countries where it was formulated, its simple application might obscure important aspects of the under-utilization of labour. New conceptual frameworks and analytical procedures were being developed for experimentation in several countries. The scheme developed by the Organization of Demographic Associates (ODA) was under study by the Committee on Asian Manpower, Studies (CAMS) that scheme would make it possible to measure unemployment, part-time unemployment, and various forms of under-employment.

Since changes in the labour force in the following 25 years would be predominantly a function of the population growth rate rather than changes in labour force participation rates, closer measurement of fertility and mortality and population growth rate was an urgent need. The "*dual approach*" was recommended where registration data were inadequate i.e. matching census results or surveys with results of independent sample registration system.[19]

Standard of Living in India

What is the standard of living of the average citizen of India ?

Technical definitions apart, a standard of living can be simply defined as the level of consumption of the basic

requisites of civilized human existence in terms of food, clothing, housing, educational opportunities, health facilities, leisure and certain cultural amenities. Recent and accurate statistics show that for the average man this standard is low." (Chandrasekhar 1971)

"Since the 0–14 age group is likely to remain about 40% of the total population for some time to come, the working population (48%) (15 – 59) will have to carry a heavy burden in supporting this large young and consuming group. In 1956, in India there were 1.15 dependents for every income earner. In 1970 there were 1.46 dependents, for every income earner. Should mortality further decline, this number will increase.

It is estimated that the backlog of employment at the end of the second Five Year Plan (1956) was 9 million and that the additional employment needed during the Third Plan (1961-61) to wipe out the backlog and absorb the new entrants into the labour field is 26 million jobs.[20]"

"India's total national income, for instance, rose by nearly 40% during her first two Five Year Plan periods (1951-61) but the per capita income increased by only 19% during the same period." (Chandrasekhar)

The rapid increase in labour supply in the future will require tremendous efforts in terms of expanded employment and investment requirements, but will also provide scope for accelerated economic and social development if properly and fully utilised. It would require manifold expansion as compared with presnt efforts in order to provide employment and livelihoods for the more than 1 billion new workers (in Asia) expected within the next 3 decades.

A major problem will be to mobilize the human resources in the countryside, where the large majority of the active population will continue to live. The absorptive capacity of labour in agriculture is generally considered to be very near

optimum already in most of the Asian countries and the prospects for increasing employment opportunities - short of there being major technological break-throughs and institutional revolutions—will not be sufficient to absorb a substantial part of the growing labour supply. Although the proportion of the working population engaged in industry rose substantially in the developing countries in the 1950's, only one fourth of the overall increment in the total working-age population went into industrial development ; the bulk of it had to remain on the land, where it mainly contributed to making the under-employment problem more serious.

In the future, special emphasis must be given to provide employment opportunities for the rural workers outside agriculture and make them a dynamic factor in economic and social development in other sectors.[21]

In India, the effects of population growth on economy can be condensed in to the following statements :

1. Rapid Population Growth means a larger percentage of people in the younger age group.

2. The younger age population are consumers (like the rest of the population) but very few of them are producers.

3. Investment is the process of building up production.

4. Rapid population growth tends to decrease the opportunities for investment.

5. The growth of production is mainly dependent upon investment. With less investment, there will be less increase of production.

6. Per-Capita income is a rough index of the economic situation of a country.

Educated Unemployed

The labour force in India is growing so fast that in the fifteen years since the Five Year plans started though 31 million new jobs had been created by 1965, unemployment also rose to 10 million from 3.5 million in 1951 - 52, and it is estimated that about 20 million people are underemployed. By 1976 new jobs will have to be created for 71 million people.

The unemployment rates among our young men aged 16 - 17 and 18 - 21 are 15.9% and 9.6%, but in large cities, they rise to 37.2% and 16.2% respectively. An increasing number of young people, therefore, are facing a grim situation where they cannot find suitable employment. The educated unemployed, in particular, pose a serious problem whose repercussions can be very far-reaching.[32]

Professor K. M. Dantwala, eminent agro-economist, suggests that the problem of unemployment in rural areas is not serious. He draws his conclusion on the basis of a four-fold test of labour force participation rates, its incidence as measured by unutilised labour time, subjective evaluation of families in regard to the possibility of supplementing their incomes and the willingness or ability to spare at least one member of the house-hold for full-time regular employment.

Prof. Dantwala, after giving statistics on the above counts of States like Tamil Nadu with the highest incidence of unemployment or one of the poorest States like Orissa, says that they indicate the need to exercise extreme caution in drawing conclusions from even the regionally compiled data on the nature and magnitude of unemployment.

He also maintains that the incidence of unemployment as measured by percentage of unutilised labour time is no indication of the incidence of low income. Persons may be employed for a large number of days and yet their earnings may be very low. More important for the purpose of

designing rural employment programme is the fact of unwillingness or the inability of a large number of villagers to take up regular full-time employment and their low rating of the possibility of supplementing their incomes through ancillary agricultural or non-agricultural activities.

It would thus appear that the best hope of augmenting low incomes of the poor lies in higher productivity in their current activities rather than through rural works programmes needing a shift from their current occupation or location.[23]

Ten Most Powerful Nations by National Income 1952–54*[1]

	National Income (millions of U.S. Dollars)
U.S.	298,530
Soviet Union*a	110,000
U.K.	39,480
West Germany	24,990
China*b	
India	22,320
Canada	19,360
Japan	16,470
Italy	14,740

*1 U. N. Statistical Office 1952 – 54

*a 1954 only. Figures on the Soviet Union are not included in the U. N. Study but have been estimated independently.

*b No data for 1952 – 54. Rank estimated on the basis of 1949 rank.

India, too, is potentially a nation of greater power than either the U.S. or Russia. When she finally solves her population problem and gathers enough momentum to change her economic life to accord with the brave hopes and promises of her leaders, the second place in world power should be hers.[24]

Facts and Figures of India's Foreign Trade

India today has come a long way from being a supplier of raw materials for factories in Great Britain and other developed countries of the world.

In 1947 India's exports consisted of raw materials and some processed goods, whereas finished consumer goods constituted the bulk of the import list.

Today practically no consumer goods are imported, the country being self-sufficient in most of these items.

Since Independence, India's foreign trade has expanded greatly—from Rs 8,640 million (US $ 1189 million) in 1947–48 to Rs. 34190 million (US $ 4702 million apprx.) in 1971-72. During the first seven months of 1972–73 (April-October 1972) the foreign trade of India has reached Rs. 20.665 million (US $ 2842 million).

Four commodities—tea, raw cotton, jute manufacturers and cotton textiles— accounted for 60 per cent of India's total exports at the time of Independence. Today, these four items account for less than 30 per cent of India's total exports.

Manufacturers and non–traditional industrial products have come to occupy an important place in the pattern of India's export trade.

Wide Range

A wide range of durable consumer goods, plant and machinery, transport equipment, heavy electric transmission lines and towers, and railway track material are finding their way not only to the developing countries of Asia and Africa but also to sophisticated markets in industrialised countries.

India earned foreign exchange of the value of Rs. 1184 million (US. $ 163 million) 1971–72 through the exports of engineering goods.

All this has been achieved as a result of a policy aimed at import substitution and export promotion ; imports have been restricted to those articles which are necessary like industrial raw materials, machinery and plant.

In the case of a number of articles, imports were banned because India had started manufacturing them. In the case of certain goods, like motor cars, imports have been banned as a measure of economy inspite of domestic production not coping with the demand.

In previous years, foodgrains accounted for a sizeable part of the import bill but now the imports have been reduced to the (minimum).

The import policy has largely had the effect of encouraging the domestic industry and import substitution. The direction of India's foreign trade has become broad-based. New trade links have been established with East European and Latin American countries and the Afro–Asian world.

Twenty five–years ago, all our requirements of crude oil and more than 90 per cent of our requirements of petroleum products were imported. Now a large number of petroleum products are produced by Indian refineries. The production of crude oil in the country today is over 75 million tonnes per annum. Search for oil in the offshore areas of the Continental Shelf, particularly the highly promising Bombay High structure is now under way.

Quality Control

Similarly, in 1955–56, sugar mill machinery was being imported. Today, not only are internal demands met

by Indian sugar mill machinery units, but some of their production is also being exported. The same is the case with soda ash, caustic soda, sewing machines, bicycles and many other items. Barely 10 percent of the country's requirements for paper boards, man made fibre and yarn and bleaching powder are being met by imports as against 25 per cent in 1950-51.

Exports are expected to grow by 7 per cent (compound) per annum during the current Fourth Five Year Plan. It is estimated that by 1973–74–the last year of the Plan–the exports will amount ot Rs. 19000 million (US $ 2614 million). This will mean an increase of about Rs. 5420 million (US $ 745 million) from 1968–69.

During the first three years of the Fourth Five Year Plan the growth rate of exports was on an average 5 to 6 per cent. During the first seven months of 1972–73 the growth rate has been as high as 22 per cent as compared to the same period last year.

Out of 153 joint ventures approved so far, Indian entrepreneurs have set up over 100 joint ventures abroad in recent years. Thirty–seven of these have already gone into production in Ethiopia, Kenya, Libya Mauritius, Nigeria, Ceylon, Iran and Malaysia. Some of these joint ventures are in advanced countries like the U.K., Canada, West Germany and the U.S.A.

On the eve of Independence, quality control over India's exports did not exist in any organised way. Today, over 85 per cent of India's exports are subjected to a rigorous system of quality control and pre-shipment inspection.[25]

One feature of the economic demographic interrelationship deserves mention here, and that is the *effect of population growth on income distribution*— another subject which has received little attention. We have hitherto been discussing the relationship in the reverse direction of causation. But there

is a simple argument suggesting that population growth in developing countries has been partly responsible for the intractable problem of maldistribution of income. If the poverty of a person's domestic background is the major determinant of his earning potential, and if the poor have more children than the rich, it will follow that population growth will tend to work against improving distribution of income. The second of these assumptions is in fact open to doubt – the poor may have higher fertility than the rich, but end up with smaller families because of much *higher mortality*.

The last few years have seen a major alteration of emphasis in development studies, giving greater centrality to the issues of employment and income distribution. (See e. g. ILO 1970, 1971, 1972). It would be crude, but not wholly unjust, to say that previously economists put growth to the forefront, in the expectation that unemployment and poverty would thereby be reduced ; conscious measures of income redistribution were regarded as enemical to growth because of a supposed adverse effect on savings. The combination of the actual experience of growth, which in many developing countries has failed to make much difference to the lot of the poor, and a number of theoretical observations suggesting that redistributive policies may not hinder growth, has led to the view that active measures to create employmen and alleviate poverty have a much more important place in the strategy of development.

So far, these shifts of thinking have not penetrated the literature on population and development to any great extent. In fact the arguments for redistributive policies are greatly strengthened by consideration of their relation to the population question. For if the accepted explanations of fertility decline are valid, the demographic transition will accompany economic development the more rapidly, the more development reaches down to the poor. This is particularly true for the poorer among the developing countries.

On the basis of a definition of poverty as an income just sufficient to purchase an adequate diet, it is commonly quoted that 40% of the population lives at or below the *poverty line*. It should be added that the vast majority of those above that line are quite poor by Western standards. A man earning £ 15 a month would be in the top 30% of incomes. The number of people in India who lead a material life comparable to that even of a well - off working family in Britain is quite tiny.

Much interest centres on the question of whether the level of living has deteriorated in India in the last two decades. Average income per head has been rising, since the average rate of growth of GNP has surpassed the population growth rate. But what of the 40% in poverty? At a conference in New Delhi two years ago, some of the papers maintained that the proportion below the poverty line had increased, or that the poorest deciles had suffered reductions in incomes.

There are, however, other things which should be put in the balance. The average villager is more likely to go to school that he or she used to be, he will be closer to a good road and therefore have easier access to a nearby town; the town is more likely to have a cinema; the village if not the villager – will possess a radio; if disaster strikes, in the shape of drought or floods, the village is more likely to receive assistance; its more likely to be within reach of a modern health centre; and villagers are living longer. It is this last fact which makes one sceptical of any claims that the lowest deciles have become substantially worse off; one might argue that they were previously so close to the margin of survival that any worsening ought to result in traversal of the margin.*

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* Of course, much of the improved chance of survival is due to the achievements in public health referred to above, and it is possible that other aspects of living conditions have deteriorated while death rates have declined. This quite possibly was the case for the period up to 1950, though it seems improbable for the more recent past.

Nevertheless, poverty and malnutrition are the lot of a huge share of the Indian people. It must be asked to what extent population growth is the cause of this. At such a point in the argument, many would point to China as a vast country with an enormous and, at least until recently, rapidly growing population, where the kind of destitution common in India seems to have been abolished. "A social system that promises nothing to the individual cannot lay down breeding rules for him." (W. Ahmed). It cannot be denied, as was said earlier, that if India's socio-economic structure were better adapted to the absorption of labour, its rapid population growth would pose smaller problems. The alternatives would still, however, be a rapidly growing population and slowly improving living standards, or a more slowly growing population with material conditions improving faster. But India has not had a Maoist revolution, and many would believe that it is unlikely to have one. Even with its present economic and political framework, however, poverty and under-utilization of labour cannot be blamed by any means entirely on population growth. Had employment–oriented strategies prevailed earlier (it is understandable why they did not), or had the the strategies which were adopted been pursued with greater efficiency and purpose, much of the abject poverty prevailing today might have been reduced, if not eliminated.

But the relative magnitudes must be borne in mind ; however much additional employment might have been created with feasible policies, it has to be set against a growth in the labour force of more than 50% in the space of the last 20 years. Whatever could have been done for these growing numbers, much more could have been done for a more slowly growing labour force. There are few (if any) arguments which show that 50% have added to the economic surplus available for development ; there are many arguments suggesting they have reduced it, for although a large proportion of total savings are domestic savings,

which have continued to grow in recent years,* it is mainly public and corporate savings that have failed to expand sufficiently, in no way due directly to the growth of population ; and while there has been some diversion of public investment into less productive uses as a result of population growth, this has not been *pari passu* with that growth. Influences other than population growth on savings and the composition of investment have had considerably more importance.*

Fundamentally, however, the path to the elimination of poverty in a mixed economy is the development of labour shortage, and with a labour force growing at such rates in a very poor country, conditions of labour scarcity are unlikely to materialise. It is in a way remarkable that the addition to India's numbers of 250 million people in the last 30 years has occurred without dramatic deterioration. That should be remembered when the future is being examined. The next 30 years will add something like 400 million ; but the economy is that much more advanced. It is becoming more adapatable, and wealthier. It is also becoming in certain ways more vulnerable ; as economic sophistication grows, so does economic interdependence : the failure of a part may become more expensive to the whole. Thus droughts now hurt industry by reducing the supply of water to hydro-electric plants. And one thing population growth does do is to magnify the impact of natural disasters — the greater the density of settlement in an area, the greater the destruction of personal livelihoods by droughts or floods. In general one can only speculate as to the relative balance of growing vulnerability, and growing capacity to cope with adversity. The task of analysing the future is to identify potential discontinuities. Will the next 30 years bring simply more of the

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* Perhaps more slowly than they would have done with lower population growth ; but since most private domestic saving is done by the rich, population growth does not much affect it.

the same, or is there some threshold for particular facets of the economy and society beyond which additional population growth will produce intolerable strains? The evidence so far seems to suggest the former.

India's population is unlikely to cease to grow before the early decades of the next century, by which time it will be more than double its present size. Family planning plays a limited but important part in reducing fertility; it can succeed when other conditions favour it. These other other conditions appear to be *reduced* infant and child mortality, improved *education* and living standards, and higher employment rates, especially for *women*. The interrelationships between these factors and the economy and society at large are such that they cannot be thought of as some sort of 'package programme' with costed inputs that can be compared with other programmes. The raising of the incomes of the poor is fundamental to all the important factors; and raising their incomes entails generating employment, which in turn requires a shift in the structure of demand and of the output of wage goods.

Development planning, should be thought of from a population point of view. In particular, planning should focus on the diffusion of the material conditions of socio-economic change which accompany the demographic transition. If the poorer developing countries have to wait for industrialisation and urbanisation to bring those conditions into existence, they may have to wait an extremely long time.

These arguments reinforce the claims for the superiority of employment-oriented strategies which have been made elsewhere on other grounds. Indeed they go beyond them, in suggesting that other strategies are likely to be neutralised, at least in part, by excessive growth of population.[26]

Inspite of her heavy handicaps India is considered a good bet by not a few economists. Barbara Ward, reflecting that after the pre-investment stage these investments

begin to pay off, remarks : ' Of all the countries at this stage of growth, I would say that India is the most important. The framework of a functioning economy is already built. ' The great need for the next decade is foreign aid ; if that is available and both India and Pakistan' take off, ' then ' more than half the problem of underdevelopment could be met there in the Indian subcontinent, ' and that means nearly half the population of the underdeveloped countries.

Recent studies in the West suggest that between sixty and fifty percent of the gains in productivity in the last century spring from better trained minds, from research and a more systematic use of the economy's ' brain power. ' An example is the tragic consequences in the Congo where at the time of independence there were perhaps not more than a dozen people with university degrees. No modern economy can be built on this basis. Fortunately in India, the problem is not to find educated people but to utilize them for their own and the country's profit.

At the end of another challenging book " India and the West, " Barbara Ward makes a moving appeal to the West to come to the aid of the underdeveloped countries and to India's aid in particular. The donors will not only help themselves economically – by developing a new and vast market – but they will also save themselves from ruin. The ' starving men, bundled in rags' lying on Calcutta's pavements are ignored at the rich nations' peril. Just so did the nobles of France ignore the peasant starving at their castle gates. Behind the Indian figures and statistics lie the realities of children without bread, men without work, women without hope. If these do not move us to action, the outer form of our society may survive but its inner spirit will have withered way.

THE POPULATION PROBLEM — A WORLD CONCERN

The Haves and Have-Nots

It is said – " There are *two kinds of countries* in today's world – those with a high standard of living and low fertility, and those with a low standard of living and high fertility. "[1] To put it simply, those families in the *HAVE* group, a minority which enjoys abundantly the fruits of labour of the majority *HAVE NOT* families, who by the sweat of their brow supply the increasingly fastidious and autocratic demands of their more fortunate, can we say, ' brethren '

As Robert McNamara, President of the World Bank said, " The gap between the rich and the poor nations is no longer merely a gap – it is a chasm. " On the one side are nations of ths West that enjoy per capita incomes in the 3000 range. On the other are nations in the Third World that struggle to survive on per capita incomes of much less than 100 ![2]

In this last year, 1973, the 25th anniversary of the U. N. Declaration of Human Rights, how far have we come in making this world, which has one roof, a home for all?

Many developing countries are caught up in what is sometimes called the '*Poverty Cycle*,' where any economic gains that a country may make are immediately eliminated by the demands of the rapidly growing population. In order to break this cycle, either the rate of economic development must be speeded up or the rate of population growth must decline.

How does this process from high to low fertility come about? One thing which is obvious from the start is, that the change does not take place in a vacuum. Other aspects of the social and economic strutcure must also change. It must also be remembered that the type of changes necessary will vary greatly from one type of society to another. That the process is very complex is envinced by many writers who show that there is a tendency for rapid economic growth in developing countries to be associated in the short run with increasing fertility. For example, in a study of latin America, Heer (1965) found that when levels of certain social and economic indicators were held constant, *fertility varied directly with per capita income* and it was hypothesized that the immediate effect of economic development was to increase fertility. This phenomenon is associated with what demographers call the 'stage of transition' and it is considered temporary. However, in order to progress through this stage, it is necessary to reach a certain level of economic and social development. Once that level is reached, it is postulated that fertility will then begin to decline and be stabilised at a much lower level. It is not known what combination of indicators or what levels would represent the necessary threshold.

However, certain factors which usually accompany the process of economic development can be recognised as being more likely to depress the fertility rate eventually than others. Heer (1966) recognised two as being of particular importance :

a) An *increase in the level of education* which often allows new employment outlets or encourages new aspirations.

b) A *reduction in infant and child mortality* which in turn makes people realize that they require fewer children.

Heer therefore stresses the need for large Governmental expenditure on education and health in developing countries, which, he maintains, will enhance the reduction in fertility obtainable from an increase in national economic level alone.

In societies where Family Planning has been widely accepted, it has been part of an integrated system of life ; this is illustrated by an economic system that motivates people to adopt the small family norm, for example in Western Europe.

By contrast in India, the economic system which requires children to work for and support their parents, is not a type likely to encourage the small family norm. Under these circumstances, Family Planning practice involves the grafting on to a society of a pattern of behaviour and a norm that do not really belong.[3]

Thus when children are for the majority of the population of India, "economic assets", how can we, merely by implementing family planning programmes, solve even to a major extent the problem ?

It has been calculated that a child born in the U. S. is likely to consume in the course of its lifetime 28 times as much as a child in India. "The birth of an American baby is a greater disaster for the world than that of 25 Indian babies."[4] Moreover, if populatation is equated with ecological decay or over-use of resources, it is the developed countries that are really guilty. America has 6% of the world's population and uses 40% of the world's fuel. The fuel crisis of 1973-74 has thrown into sharp focus the extreme dependence of the industrialised countries on the resources (oil, etc.) of developing countries.

The per capita annual consumption of minerals including construction materials varies from 40 in the U. S. to between 30 and 1 in the less developed countries to less than 1 in the developing countries.

China, India and Japan with 40% of the human race, are confined to 10% of the earth's surface while Canada, Australia and New Zealand which make up an equal area in land, have less than 1% of the world's population. What stands in the way of sharing underpopulated, habitable land of the world, is the racist immigration policy of certain countries which largely, though not exclusively, admit people from Europe. They evade the real issue of sharing the world's land by focussing the world's attention on the dangers of population explosion.

The efforts of the rich nations and international organisations to promote population control in the poorer countries are at least partially motivated by fear of territorial expansion by the poor. If the rich were really concerned with alleviating the misery of the poor, they would find intolerable the present situation of injustice. Overpopulation in the poorer countries presents little threat to the world's resources, if the poor remain in their under-developed regions. But it is possible that they will overflow the frontiers of their lands, and that is what appears as a threat to the present world order and the distribution of land resources.

Speaking of the staggering difference in the living standards of different people, "120 million Indonesians and 75 million Bengalis can live on 1/40 of what 200 million North Americans consume. Thus, even if their population multiplies by 40 in the near future, at their present level of consumption they will not use as much energy as North Americans use today.

Hence, the primary concern of the population year should be to correct the present disproportion. The unplanned use of resources for armaments and luxuries of the few, often resulting in the creation of junk and the pollution of nature,

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is an immediate cause of fear for the future of the human race and its growing population.

One of the main targets of the population year is population control or birth control. To achieve this goal, institutions like the U. N., the World Bank and the International Monetary Fund bring pressure upon poor countries, through their aid programmes, to give top priority to population control in these countries. But these *same agencies are incapable of bringing any pressure on the rich nations to control the use of the world's resources or to stop exploiting the poor nations whose scarce resources are often siphoned off by the investing rich nations.*

A study of firms with foreign investment in India shows that the amount of foreign exchange repatriated is astronomical compared with the modest investments these foreign companies have made.

"Some of the firms who have repatriated in foreign exchange huge amounts during 1970–71 are (The figures in brackets are foreign investments) Abbott Laboratories : Rs. 22.44 lakhs (Rs. 1 lakh) : Pfizer : Rs, 93.52 lakhs (Rs. 300.24 lakhs) ; Merck Sharp & Dohme ; Rs. 19.87 lakhs (Rs. 108 lakhs) ; John Wyeth (Branch) : Rs. 21.95 lakhs ; Coca Cola Export Corpn. (Branch) : Rs. 160 lakhs (Rs. 6.6 lakhs). These figures show that the repatriations are astronomical compared with the modest investments these foreign companies have made..." It was revealed in Parliament that Colgate-Palmolive (India) Pvt. Ltd., a fully owned subsidiary of Colgate-Palmolive International, U.S.A. has repatriated Rs. 1.5 crores in the last three years against a small investment of Rs. 1.5 lakhs. (The Economic Times, Dec. 7, 1972).

The figures cited above demonstrate that the world population problem can never be viewed in isolation or treated as such. It is a multifaceted problem aggravated or complicated by the economic, political, social, cultural and religious issues of the day. Finding a legitimate means of

reducing the present rate of population growth is surely a solution. But it is only a partial solution.[5]

According to recent figures of the UNESCO, 2/3 of the world's population live on less than 12.5% of the world's produced wealth, the remaining 1/3 consume 87.5% of it. **Quoting Helder Camera—"Today 85% of people rot in misery to make it possible for 15% to live in comfort."**

Chile's delegate to the U. N. General Assembly said that the population growth problem is "artificially emphasized by developed countries as an excuse for them to escape their obligations to the international community;" the real need was, "to attack the causes of underdevelopment through an increase in trade and financial aid, greater access to modern technology and co-operation between developed and developing countries in all areas of technical assistance."

Miguel A. Ozorio de Almeida, head of Brazil's delegation to the Conference on Human Environment, attacked the, "attitude that the developed countries have demonstrated by their development, a special right to salvation and perpetuation, thus passing on to the more numerous underdeveloped peoples the responsibility for creating the necessary space on earth....Emphasis upon population growth as such, unlinked to the relationship of the population to the national resource base — including geographical space— is inadequate and unacceptable. Countries with more than 100, 200 or 300 persons per sq. km. are thus left outside this approach, while countries with fewer than 20 inhabitants per sq. km. are being condemned for demographic policies that would bring about increased economic efficiency and constitute a necessary condition for their national integration and fulfillment as a human community." "If resources are to be shared by all peoples, then economic power, industrial productivity and financial control should also be shared."—he maintained.[6]

It is tragic but true that the tremendous population explosion taking place in the developing economies is, if anything, widening the gulf between the rich and poor economies of the world — the Second U. N. Development Decade notwithstanding! In the last decade (1961-71) the population of Britain increased by 5%, the population of France by 11%, the Dutch and Americans by 13% and the West Germans by 10%. During the same period the population of India increased by nearly 26%, that of Brazil and Nigeriaby 33%, Malaysia by 36% and that of Mexico by 40%.

The situation today is such that a quarter of the developing economies are not in a position to mobilise adequate resources to keep in step with the growth in population. During the decade of the '60's developing economies of Asia saw an increase in the GNP of the order of $50 per capita as against $ 700 per capita in the industrially developed countries of the world. The developing economies of the ECAFE region have shown a declining growth rate in recent years-6.8 in 1969, 6.1 in 1970, 5.6 in 1971 and 5.0 in 1972. The major factors in this tragic trend are of course several — the cutback in gross investment, decline in domestic savings and slowdown in world trade–but the most important factor responsible for the crawling growth rate of per capita income in the countries of the ECAFE region has been the explosive growth rate of population.

The majority of mankind – Asia, Africa and Latin America – is poorer, illiterate, agrarian, underfed, malnourished, and poverty stricken. The tiny rich minority English – speaking North America, Europe, the Soviet Union and Japan cannot stand as helpless spectators at the growing gulf between the rich and the poor world. Prudence and commonsense demand re – ordering and rationalisation of global economic activity such as to create more jobs, lower prices, higher living levels and a more equitable distribution of wealth and income among the different countries of the world. The pursuit of superaffluence by the rich nations in the face of grinding poverty

of the poor countries is bound to prove inconducive to world peace and progress.

Moreover, in the enmeshed global economy of the late 20th century, population is an international problem. Like trade, production, monetary matters, technology, energy and commodity exchange, *the population problem has no purely national solution. It can be solved only through multinational or global co-operation.*[7]

The Brain Drain

The Brain Drain is a serious crisis which, if at all, the West has taken negligible cognizance of. "At present, about 1/3 of the doctors staffing Britain's hospitals come from abroad." In 1968, after the abolition of the national quota system, the U. S. granted immigration visas to 16,000 specialists from regions outside the Western hemisphere. The U. S. Department of Labour has estimated that this figure will reach 60,000 by 1975 and will include 7880 engineers, 3600 scientists and 4800 doctors. *The U.S. thus emerges as the world's chief importer of skills, the final destination of migrant brains.*

But there are a number of "stop – overs" en route, mainly in Western Europe and Canada, where many intellectuals and specialists from the Third World have already settled. It is estimated that Britain has attracted more specialists of all kinds including some 4000 doctors, from the Commonwealth countries, than it has itself provided. The situation is similar with regard to France and the various countries which it assists; to cite but one example, the number of doctors and teachers who have come to France from Togo exceeds the number of members of the same profession who have travelled in the opposite direction.

Whether it be in North America or in Western Europe. the same phenomenon may be observed of have – nots succumbing to the allurements of the haves. At a time when the

International Community is unanimous in recognising the urgency of development, this state of affairs is seen by many as not merely paradoxical, but very grave.

The draining off of brain power from the poor to the wealthy countries, which only serves to widen the gulf between them, has been described as a "national disgrace" which in some cases, more than cancels out the positive effects of American aid programmes. The Christian Science Monitor has observed that whilst with one hand *the U.S. disburses millions of dollars in assistance to the developing countries, it nonchalantly scoops with the other hand those very specialists whose training in the natural, applied or medical sciences makes them out as future leaders of their own countries, more valuable than foodstuffs or technical equipment.*

The population explosion began in England with the Industrial Revolution and Europe was able to use immigration as a major measure to relieve the pressure of over-population in her countries. Families in thousands, usually poor and often with no skills, criminals and other undesirables, emigrated to the colonies, America, Australia, New Zealand, Africa, etc. Whereas today, it is only highly skilled scientists, doctors engineers, teachers and nurses, that India badly needs herself, that are admitted into these developed countries.

The *field of Medicine* in particular offers room for conscience-searching. Every year, approximately 1,200 doctors arrive in the U.S. as immigrants. The value of these "imports" appears to correspond closely with that of all the foreign medical aid, from both private and Governmental sources, provided by the U.S. Aid one may well ask whether some of these doctors, who have come from countries whose public health services leave much to be desired, might not usefully have been employed at home rather than in American cities already adequately supplied with physicians.[8]

We are not only approaching the Population Year, 1974, but also the year 1975–the mid-point of the Second Development Decade. The recent conference of the leaders of the non-aligned countries in Algiers has freshly reminded us that the goals of the Decade are seriously jeopardised and that almost all the developing countries are still under a direct or indirect imperialistic exploitation. We can hardly stress enough that the progress of mankind is vitally linked with the establishing of the new international relations where the effort of developing countries to catch up would not be cut short by any individual big and rich country or by a group of developed countries through policies which can give to the governing classes some short term profits-but are more and more dangerous for the world as a whole.[9]

Fertility control in the West was preceded and indeed determined by Social Change and yet some would deny this right to the poor countries.

Increasingly the evidence accumulates that :

1. The family of higher socio-economic status has a higher sense of security survival confidence ;

2. If one has a higher sense of security, one does not need a large family ; and

3. Therefore the family of higher economic status tends to have a smaller family size.[10]

In his paper "Planned Parenthood reconsidered, Human Rights and Welfare Aspects", Thorsten Sjovall says of the International Planned Parenthood Federation's work–"The result is that today in the eyes of innumerable people, we are something between nothing at all and an organisation with the starkly dominating aim of curbing population increase in the world, particularly of the poor world. Recent proclamations to the effect that the U.S. and the U.K. are indeed overpopulated too, has so far made little impact on this image.

Instead of consistently pursuing the Singapore vision of a number of profiled regions which with due respect for their ethnic characteristics were encouraged to find their way under the guidance of human rights and value principles, we helped to widen the already deplorable gulf between the rich and the poor by adding a demographic wedge to the others. And the people of the poor parts were, to the extent that our message was reaching them at all, clearly made to understand that theirs was an undesired breed.[11]

"The relationship between rich and poor countries bears the name of violence. I call it primary violence, the mother of other violence, for those who die of poverty outnumber those who die in wars. When starving people take to armed revolt, this is secondary violence. Authorities repress them-that is the third kind of violence." (Helder Camara).

The only way to end violence is to define its source courageously – *injustice*. Unfortunately, when you speak with the rich and the powerful their reaction is that, focusing on injustice is subversion and communistic.

"On a global scale it is probably true to say that the population problems of the Third World countries have arisen primarily as a result of colonial impacts on the economies of these countries. It is certainly true to say that during the 19th century, many underdeveloped countries experienced demographic stability and yet this in no way facilitated economic growth, nor did it prevent the economic gap between the Western and non-Western countries from widening."[12]

Development is the enchancement of human dignity and in no small measure did India (to take only one example) help England, for example to dignify itself to its present material standard of living. India, described as the brightest jewel of the British Empire, clothed Britain, fought in her wars and provided her with raw materials and labour for her colonies.

The Great Land Grab

Few undertakings in human history have had a greater impact than the enormous, prolonged effort to Europeanize the world. The psychological investment in this drive may explain both the West's lofty promises of abundance for all men and its complete misjudgement of mankind's true situation. In truth, the white man's experience has been misleading. No group of individuals ever seized a greater body than did the Europeans who took possession of the vast forests and rich prairie soils of the North American continent. Unassauged, the white man also grabbed the fertile pampas and most other good soils in Central and South America, the South African veld and the rich highland plateaus of interior Africa. He managed to gain control of an entire continent, Australia, with its valuable satellite, New Zealand. In addition, he secured strongholds all over Asia where he monopolised trade and to a considerable degree controlled agricultural production, making India British and the East Indies Dutch.

The Second World War ostensibly brought to an end this era in geographical relations But as late as 1939, shipload after shipload of groundnuts left starving India to fatten the cows of the British Isles. Hundreds of millions of people in Asia and Africa have since attained independence. Superficially, world food markets have adjusted to this fact. *More than 25 million tons of grain are now moving from wealthy areas to feed the hungry–as against the latter part of the 1930s where 11 million tons of cereal grains were dispatched from the hungry world to provide for the well-fed.*[13]

Two well-known examples are instructive as to how economic liberalism in the domestic economies of the underdeveloped countries promotes monopoly and thereby the underdevelopment of the majority.

One example is the 19th century break-up, in the name of liberalism, of communally held Indian land, its distribution into private ownership, and consequent monopoly concentration during the epoch of liberal reform – a concentration that far exceeded that of the autocratic colonial times. Another example is the currently ever greater monopoly concentration of finance, commerce, industry and still of land in the under-developed countries under the aegis of the "free" world's "free" enterprise. It is clear then that the diffusion and acculturation of economic liberalism between the developed (or developing) metropolitan countries and their undeveloped satellites-as well as that within the under-developed countries - is a response to interests and produces consequences which can be summed up in a single word - monopoly.

Through this monopoly, economic liberalism has contributed to the economic development of those who diffuse it ; to, as the U. N. Commission for Latin America calls it, the limited "outward oriented development" of the capitals of the under-developed countries ; and to the evermore under-development of the world's majority.

The diffusion of political liberaiism which accompanied and followed the spread of economic liberalism cannot be said to be very different [14]

The monopoly of the European tribe, however, is still strong in the economic field. While public attention is focussed on grain, let us direct the searchiight to other commodities and especially to proteins. Here the West finds no cause for self-congratulations. *The almost 3 million tons of grain protein recently contributed to the poor nations by the rich and well-fed have been more than counterbalanced by a flow to the Western world of no less than 4 million tons of superior proteins in the form of soyo beans, oilseed cakes and fish meal. The West is benefiting from a most deceptive exchange.*

Crops for Cash Vs Crops for Food

Thus, although it has far greater per capita soil and water resources than the hungry world, the West is tenaciously intruding on the later's struggle for subsistence. Hundreds of millions of people in the tropics must limit their harvests for domestic consumption in order to raise export crops (groundnuts, cotton, coffee, tea and cocoa, etc.) for foreign currency. This situation is further aggravated by the fact that the cash crops now enjoy a high priority with regard to credit, fertilizers and irrigation. Their fortunes in the world market, however, are declining. Since 1952 the developing nations have been delivering about 33% more tonnage in cash crops while registering only a 4% gain in income. Prices, of course, are largely controlled by the West. These sombre facts help to explain the collapse of two UNCTAD Conferences, both of which ended in solemn pledges by the rich countries to devote a mere 1% of their Gross National Product to the dire circumstances of the needy. *Not only have most industrialised countries failed to live up to this meagre commitment, but the percentages of GNP which the United States parcels out as "aid" has actually been declining.*

The great good luck of Western man in the lottery of history underlies his profound belief that technology will bestow a universal abundance. Good luck has also made him complacent. He imagines that he is more capable than the poor and hungry. He blames them for listlessness, apathy, laziness, inefficiency, lethargy, resistance to change, notorious backwardness and wavering creativity. In his self deception, he forgets that the ancestors of today's poor and hungry peoples created a host of great civilizations, which, with an improvidence much like his owa, wore out in their soils and forests.

In his imagined superiority, Western man chooses to label this hungry world "under-developed". If it were not for his historical oversight, he would find "overdeveloped" a more appropriate term. The overwhelming majority of the

underfed live in countries where the soil has been over-cultivated for thousands of years, where forests have been pulled down in the erroneous belief that this act would best provide for ever-growing populations, and where water reserves have been exploited to the utmost.

We should not underrate the ingenuity of Asian, African and Latin American societies which not only survive but slowly advance under these conditions. With the meagre resources available to them, many farmers in India and other parts of the so-called "underdeveloped" world display outstanding efficiency. Throughout Asia and Latin America, one can find an astonishingly thorough use being made of available land.

Hundreds of millions of hungry people live in the tropics, where farm acreages are exceedingly small and constantly fragmented through inheritance. Often it is possible to see original two to four-acre holdings which have been subdivided into five or more plots. Though large-scale increases in production are difficult even on the poor world's latifundia, we naively expect the "mini-plot" farmers of Asia and Latin America to triple or quadruple their production within three decades—something the Western world has never been able to do with all its immense resources of enriched soil and ample land.

The soils from which the poor nations must feed their people are often far inferior to those of West's "marginal" lands, which are now being abandoned by agriculture. Water is also a scarce commodity in most regions of the hungry world, and agriculture is subject to many more vagaries of climate than in the temperate regions. Moreover, the farmer in a poor nation, usually lacks capital for expanded irrigation, for fertilizers, for better sprays against insects and fungi. The handicaps he faces are so severe that any comparison with farmers in the West is absurd.

Health and Hunger

A great many people in this world are hungry or malnourished all of the time or part of the time. How is their working capacity affected? and what does an insufficient diet do to their overall health?

The prime global defficiency is that of protein. Until recently this fact was grossly neglected by experts who measured tonnages and profits but who limited their nutritional considerations to calories. Indeed, 10 to 15% of the world is short of calories, or "undernourished." But vastly more people perhaps 1.5 billion – suffer from the calamity of inadequate nutrients, or "malnutrition." A shortage of protein is the number one problem everywhere in the hungry world. Many other defficiencies related to shortage of fat, minerals (calcium, iodine) and vitamins (B_1, B_6, folic acid, Vitamin A, etc.) are also quite common, and as the hunger problem broadens, these and other dietary shortcomings will greatly assert themselves.

Today, a wealth of documentation confirms the existence of a nutritional crisis. Detailed dietary and health surveys have been made in tropical Africa, Latin America, the Carribean and other regions of the world. Many medical experts believe the situation is even more grave than these studies indicate, since victims of undernourishment who are already thoroughly sick or dead are seldom taken into account. For each case of malnutrition treated in the hospitals, many others never come under care. It is clear that the nutritional crisis has far greater dimensions than have so far been mapped out.

Some Telling Examples

Vitamin A defficiency frequently results in blindness, curtailing productivity. In India alone there are at least one million cases of such blindness. In East Pakistan 50,000 children every year are threatened with a possible lifetime of blindness due to their precariously low Vitamin A intake. The

blind have limited opportunities to contribute to society and often become a drain on it. Yet, for a few pennies a year, such blindness could easily be prevented.

Much earlier it became evident that malnutrition profoundly retards physical growth – and this too, in a freqeuntly non-reversible way. In many developing countries the average twelve year-old has the physical stature of an eight-year-old in Western Europe and North America. Indian nutritionists report that four out of every five pre-school children in certain areas suffer from malnutrition caused dwarfism. During the months of breast- feeding, children from the poorest areas grow at a rate comparable to the best nourished children eisewhere. Usually, after six months of age, when breast milk is no longer sufficient as a source of protein, growth is progressively retarded.

The relationship of malnutrition to mental growth dramatizes the issue, but the insiduous drain of malnutrition on natural development takes other even more harsh forms. Half the deaths in the developing countries occur among children under six years of age. In parts of Southeast Asia, 40% of children die of disease in their first four years. This is a proportion of deaths not cummulatively reached in the Western world until the age of 60.

The world has close to one billion children below the age of 14. A very large number of these children will never reach adulthood. They will die prematurely, largely because of malnutrition. This is the tragedy of hunger in its grimmest perspective. To hundreds of millions of children life is a very little more than a vigil of death ; it is certainly no banquet.

The true economic costs to the poor world of nutritionally induced disease inefficiency and death have never been calculated. They must run into many billions of dollars per year. Yet one can still encounter innumerable experts who would give health and dietary measures a very low priority in development programmes. We face a gigantic educational task right in

our midst thanks to a series of false notions and to the fact that most of our technology and much of our agriculture and medicine have lost sight of the ecological dimension.

The bulldozer and the miracle drugs may be chosen as symbols of Western man's simplistic faith that he has become the master of his destiny. Only gradually and painfully is he learning that he cannot go on working against nature if he is to endure.

The groundnut fiasco in Tanzania, the collapse of Gambia's big poultry project, the persistent spread of schistosomiasis in China, Egypt and Tropical Africa, the resurgence of rodents in Europe, the firm hold of malaria and sleeping sickness in tropical Africa – all are examples of man's ecological malfeasance.

But far more serious is another shortcoming. Those of the rich, well-fed world are subject to a gigantic self-deception. There is, for instance, nothing wrong with their impressive dairy development, but they conveniently fail to realize that its high level of performance depends on influx *from the hnugry world* of millions of proteins, partly of high quality. And so with other aspects of Western food production. Europe, for instance, receives through the back door over ten million tons of feed protein and close to one million tons of fish protein. In the post-war period, there has been a massive exploitation of the oceans, but only to a very limited extent does its bounty reach the poor. Japan and the Soviet Union have expanded their large-scale operations into all oceans-primarily to procure food to fill their own needs. They have been followed in high sea fishing by Eastern and Western Europe. It is true that the most spectacular gains in ocean fishing have been made by a poor country, Peru. The results, however, have been to create a majestic feeding bastion not for Peru or Latin America, but for the wealthy world, to which are annually delivered more than one million tons of fishmeal. *Post-war developments have therefore seen a steadily*

growing percentage of ocean catches being earmarked to feed the chickens and hogs of the United States and Europe and to provide cheap margarine for the industrialized populations of Western Europe. The underfed millions remain...underfed.

One third of the world, in short, is disposing of two-thirds of the harvests both from the lands and the seas. The West's glib talk of a Green Revolution therefore has implications quite different from those its propagandists like to talk about.

Back to Reality

Facing the world food issue, it is high time we abandoned simplistic notions and come to grips with the complexities. Despite innumerable projects of WHO, FAO, UNESCO and other specialized agencies, the joint efforts of governmental and international organisations have yet to reflect the magnitude of this issue. There is little awareness that, to avert catastrophe, mankind must mobilise all its available resources in money, material and brain-power.

The most serious fallacy connected with the world food issue is the idea that man's globe is limitless, when it should be evident to everyone that our planet is clearly restricted in its sources of soils and water. Over the centuries, biologically useful forests and pastures have lost far too much ground to the plough ; this implement has been pushed by mankind's growing millions into places where it has no business. Despite ingenious irrigation accomplishments, it has helped man convert far larger acreages into desert than he has managed to transform into productive farmlands.

The self-destructive process continues. One third of the irrigation water of the Nile is already used to remove salt left largely by previous irrigation. Man is fighting a desperate struggle with salt, and he has rarely managed to turn this battle from a losing to a winning one. Soil erosion is furthermore taking a frightful toll. In critical areas where land

should be reverted to forests and grasslands or where grazing should at least be reduced–all with the urgent aim of saving the topsoil–the old hell-for-broke exploitation continues. We here touch upon the basic ecological requirements for life.

We talk about giving the world adequate amounts of fertilizer, forgetting to analyse water as the major limiting factor. Only one tenth of all fertilizer is currently used by the hungry world and, absurdly enough, not for food but for cash crops. Many times more fertilizer are needed for adequate harvests today and still more to feed the additional billions of people we will have at the end of the century. But is there water enough to accommodate such a massive chemical assault on the soils? Presumably not.

Today we talk about high-yielding strains of wheat and rice, forgetting that their productive capabilities have to be honoured with much more water, much more fertilizer, more insecticides and fungicides, greatly expanded storage and processing facilities, and vastly increased amounts of capital. Even assuming all this is possible, we have yet to face up to the ecological consequences. Only in very few instances do we know these new strains will stand up in entirely new environments and under bombardment from insects and fungi to which they are not adapted. Simply by hoping for the best, we will not attain our goals. What is required is a sophisticated strategy and very large-scale measures.

Global Planning Required

Despite the euphoria over various new high protein foods now emerging from laboratories – spun soyabean protein, fish and grain protein concentrates, and so forth – their impact on human nutrition has been insignificant. There is no sign that they will be distributed to the hungry on a massive scale in the foreseeable future. Meanwhile, as the talk goes on and as

the gap between words and actions grows and grows, the ranks of the hungry increase by millions each year. It is not sufficient, in this crisis, to provide free or low-cost school lunches, to cure infants suffering from kwashiorkor, to help an occasional Indian village, to ship food relief to Colombian campesinos or Polynesian islanders, and to set up soup kitchens in the slums of Lima and San Paolo. These are all commendable acts, but the world has long ago passed the point where charity sufficed.

We are participating in a grand-scale evasion of reality which bears all the signs of insanity. *In order to bring health and restore vitality to the whole human species, nothing less is required than a global will to act, simple justice, true population control, worldwide food planning, effective execution by the scientists, engineers and public leaders of states and regions and a massive commitment of funds.* Furthermore, the resources of lands and seas must reach the larders of all mankind, not just the wealthy. It is time the West kept faith with the Atlantic Charter, which proclaims that all peoples should have equal access to the harvests of the world.[15]

It is indeed paradoxical and scandalous that there should be vast food surpluses in one part of the world and malnutrition and near starvation in another. The same can be said of other materials and goods: one sector has too much of them while the other badly needs them. Even a slight study of the subject shows how complicated and difficult it is to find a solution that will satisfy both the haves and and have-nots. But nobody will dispute that a solution should be found. *Justice, charity and common interest demand it.* It certainly is irrational that in one part of the world people should be paid not to cultivate their lands (the U.S. Soil Bank, for instance) and have to pay heavily for storing up troublesome surpluses of grain, etc. while in another part of the world, containing most of the world's population, people suffer from a severe calorie defficiency. How to make the transfer must be left to the experts; but it can be said that the giving of aid must not cause a world-wide economic

upset; it must be given in a manner that is inoffensive to the national feelings of the recipients and it must appeal to the self-interest of the donor. For, although exhortations to be charitable sound appealing, they are not very effective among nations unless some element of gain enters in as well. The suggestions of Dubley Bradshaw incorporate these points and are an indication of a line of approach. I suggest that commodities of most kinds, when surplus to any country's consumption and export possibilities at world market price, should be sold at half-price to the under-developed countries only and on long term credits (20-40 years) at low rates of interest. The surplus sales should be negotiated through an international agency affiliated to the World Bank.

In the long run, only in the vastly increasing populations of the developing countries will exporting countries find substantially larger markets for their increased production through industrial efficiency. The Western countries need to develop and cultivate those countries as customers for their goods-ultimately (when richer) at full price- as much as those countries need to import the available surplus to help their own development programmes and better the lot of their people.

For India and countries in a similar position, although the short–term view brings out many difficulties, the long-term prospect is bright. India can support very many millions more at higher standard of living than now prevails. The resources are there-some of the richest in the world-waiting to be liberated by energetically executed plans.[16]

Andre Gunder Frank continues, "Common to several approaches of the problem of economic development and cultural change is the assumption that under-development is an original state which may be characterized by indices of traditionality and that, therefore, development consists of abandoning these characteristics and adopting those of developed countries."

Bert F. Hoselitz argues in his thesis that developed countries exhibit the pattern variables of universalism,

achievement orientation and functional specificity, while under-developed ones are characterized by their opposites-particularism, ascription and functional diffuseness. To develop, Hoselitz counsels, under-developed countries should eliminate the pattern variables of under-development and adopt those of development.

Yet, specifically for Japan, France and Europe in general, the existence of particularism has been demonstrated among both upper and lower classes. Particularism is deep and widespread, especially in the working class in both Europe and the U.S., in recent migrants from the former to the latter and among non-white, rural or recent rural-urban migrant groups in the U.S.

Moreover, much of what flies a universalist flag in the U.S., and other developed countries, is little more than the cover for unsavory, particularist private interests. The developed countries export particularism to the under-developed ones, wrapped in such universalist slogans as freedom, democracy, justice, the common good, the economic liberation of free trade, the political liberalism of free elections, the social liberalism of free social mobility and the cultural liberalism of free flow of ideas.

Andre Gunder Frank continues, "The now developed countries have totally destroyed the pre-existing fabric of these societies. This was most notably the case in India which was de–industrialised."

The conservative estimates of the U.S. Department of Commerce show that between 1950 and 1965, the total flow of capital on investment account from the U.S. to the rest of the world was $23.9 billion while the corresponding capital inflow from profits was $37.0 billion, for a net inflow into the U.S. of $13.1 billion.

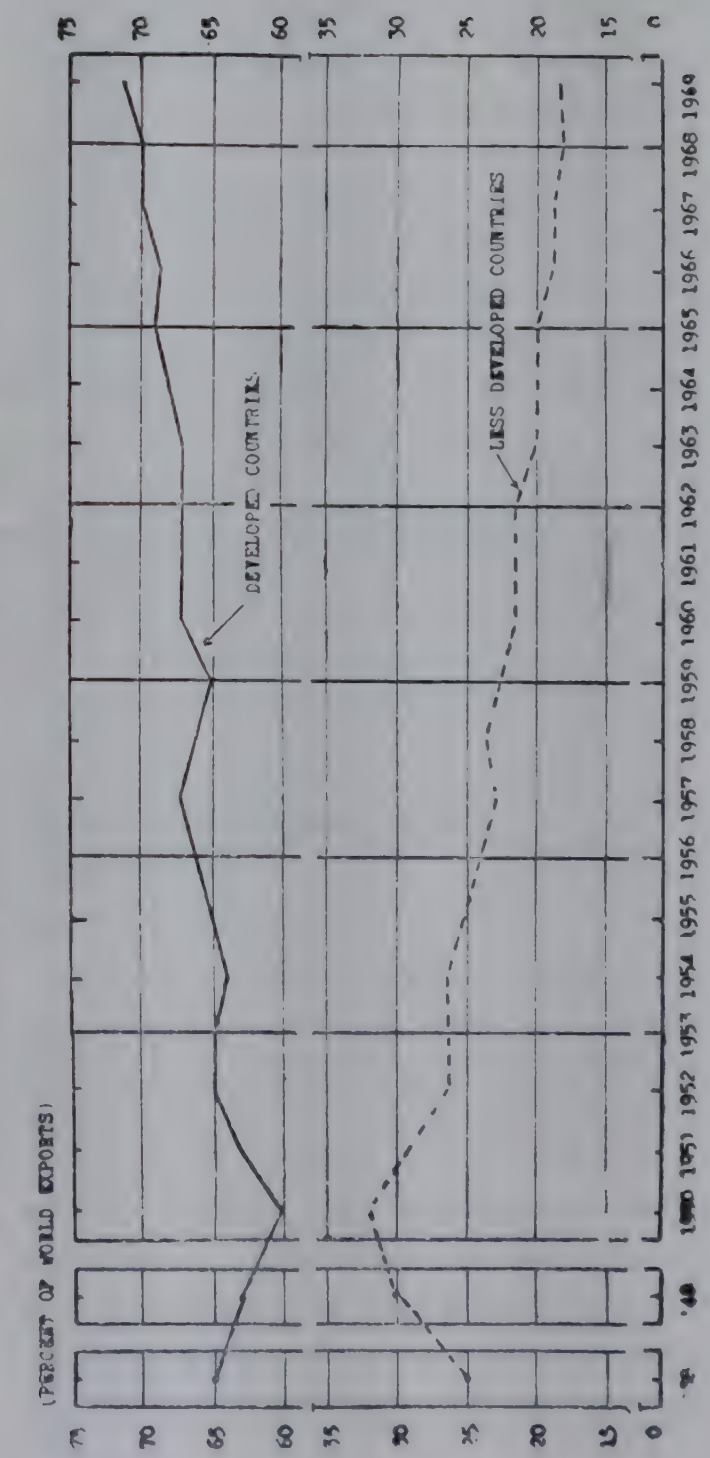
Of this total, $14.9 billion flowed from the U.S. to Europe and Cannada while $11.4 billion flowed in the opposite

direction for a net outflow from the U.S. of $3.5 billion. Yet between the U.S. and all other countries, that is, mainly the poor and under-developed ones, the situation is reversed. $9.0 billion of investment flowed to these countries, while $25.6 billion profit capital flowed out of them — **a net inflow from the poor on to the rich of $ 16.6 billion**.

Other available statistics show exactly the same pattern of *net capital flow from the under-developed countries to the developed ones.* The only trouble about these data is that they very much understate the actual flow of capital from the poor, under-developed countries to the rich developed ones. First of all they understate the capital flow from poor to rich on investment account. Secondly they obscure the fact that the largest part of the capital which the developed countries own in the underdeveloped ones, was never sent from the former to the latter but was, on the contrary, acquired by the developed countries in the now under-developed ones

There is reason to believe that American reliance on foreign capital to finance American "foreign investments" is still greater in the poor, under-developed countries which are weaker and more defenceless than Canada. *This, then is the source of flow of capital on investment account from the poor, under-developed countries to the rich developed ones.* These data take account neither of the well-known decline in the under-developed countries' relative participation in World Trade, nor of the deterioration of the terms of trade which is currently costing the under-developed countries far more capital than their nett or gross receipts of investments and loans from the developed ones. These data on the flow of investment capital leave out of account the still larger flow of capital from the under-developed countries to the developed ones on other service accounts.

Other kinds of capital loss by the underdeveloped countries are not included in these calculations, such as the notorious brain drain, or out-flow of human capital that was


SHARES OF DEVELOPED COUNTRIES AND LESS DEVELOPED COUNTRIES IN WORLD EXPORTS 1938 1948. 1950-1969
(PERCENT OF WORLD EXPORTS)
DEVELOPED COUNTRIES
LESS DEVELOPED COUNTRIES
75
70
65
60
35
30
25
20
15
0
1938
'48
1950 1951 1952 1953 1954 1955 1956 1957 1958 1959 1960 1961 1962 1963 1964 1965 1966 1967 1968 1969

financed by the poor countries for the subsequent benefit of the rich. *Who, we ask, is diffusing capital to whom?*

Beyond the question of the amount and direction of capital diffused, there is the problem of the kind and consequence of foreign aid and investment in under-developed countries. That Metropolitan investment in and control of primary sector production in under-developed countries (in, for example, sugar, bananas, minerals and more spectaculaly, petroleum) has notably failed to develop the under-developed countries, but has, instead, interposed a whole series of obstacles to their development, which have by now surely been sufficiently documented to be obvious even when viewed from the developed countries themselves.

Foreign investment in the industrial and service sectors of underdeveloped countries raise further questions. It is far from clear that even this investment helps under-developed countries to develop. Nonetheless, with few exceptions, writers from the developed countries have failed to question, much less to analyse, the supposed benefits of this foreign investment to under-developed countries. Economists and statesmen from the under-developed countries, on the other hand, are increasingly challenging these supposed benefits and are going on to analyse the obstacles to industrialization and economic development created by foreign investment. For example, a congress representing 34 schools of Latin America recently concluded that–"direct foreign investment has many unfavourable effects on the balance of payments, on economic integration and on capital formation in our countries; it determines in great measure the character and direction of our foriegn trade, stimulates monopolistic competition, absorbs or subordinates weaker national firms, etc. For all these reasons it is necessary to adopt ways and means that can impede these negative effects".[17]

Fortunately, however, there is a group that is concerned with the sharing of social justice and youth demands of its educators, of its leaders, of its families the practice of social justice. At two youth forums in 1972, these opinions and statements were expressed — In Feldafing, ... "Family planning presupposes the possibility of rational choice on the part of individuals concerned. This possibility in turn, depends on the material conditions prevailing in a society. It can only be realized in a society where the individual has access to social changes, including job opportunities, education, health services and social security. This means that Family Planning can only be successful in a society in which social equality at a high level has been established." And in Turin, ... "The development of a population policy cannot be a way of evading the importance of socio-economic structural changes which have a great impact on bringing about demographic modernization ..... and we emphasize the importance of voluntarism in Family Planning programme."[18]

To sum this feeling up, Mr. Rafael Salas, Executive Director of UNFPA at the Asian Population Conference (Nov. 1972) said, "Development is a process in which each part is intimately interrelated to every other. For one part to move forward, all other parts must be moving in the same direction. The immediate problem for millions of people in our countries is poverty, malnutrition, bad health, poor sanitation, little or on satisfying work – and little prospect of any substantial change in their lifetime. The problem is thus is not so much that population action programmes will not "bite" until a certain threshold of modernisation is reached. Changes in fertility behaviour are more likely to occur as an integral part of a general process of economic and social change which is generally speaking not yet occuring on a sufficiently broad scale in most developing countries. The situation is such, that urgent consideration must now be given to the need for alternative development strategies on the one hand and fundamental changes in the relations between rich and poor countries on the other.

In my opinion, we need not comfort each other with small progress, but it is our duty to remind ourselves all the time of the shortcomings of our work when limited only to the field of Family Planning and trying to achieve tangible results, while neglecting the effort to resolve the big issues lying at the roots of today's problems of every country and the world."

"Family Planning cannot do very much and what is still worse, it could push the promoters of an isolated Family Planning Programme into a position of advocates of unacceptable social order inside a given country. Certain Governments foist Family Planning on the population to avoid social reforms," it was stated in the International Youth Conference in Feldafing.

Modern man enjoys or aspires to a very high standard of living. This has made enormous demands on the resources of the planet, whether irreplaceable ones such as mineral ores and fossil fuels or replaceable ones such as water or the food of the oceans. While a good case can be made for the assertion that these materials, the wealth of the earth, have not always been used wisely, their use has quite certainly enhanced the quality of human life.

For example, the development of electric lighting and the whole gamut of electronic devices that marks this age would have proceeded quite differently without tungsten, and quite possibly much less effectively. It is far from certain that science can without exception find effective substitutes for irreplaceable resources. I need only remind you of the falling water table in large areas of the U. S. Continent and of the gross reduction in available foodfish in the Great Lakes. The point is that the high standard of living that some but not all Americans enjoy and to which most of mankind aspires, does make large demands on resources. "The present rate of world population expansion together with an improvement in the conditions of life of all men, would put an unbearable strain on our resources."[19]

The recent concern of the rich countries for the quality ' of the environment and the quality of life, cannot but seem to be rather selective, partial or hypocritical - at least to the Third World observers. For it appears to be compatible with saturation bombing and the use of herbicides in Vietnam and the necessity for people to starve in an era when two countries (the U.S. and the U.S.S.R.) can spend about 150 x 10^9 dollars a year on armaments.

Further, turning to the question, " Is the world over-populated ?" – this is to some extent a hypothetical pseudo-question ; since it could only have real meaning in a world where there was a pooled resource system with a World Government and in which conspicuous consumption was curtailed and production was rationally organized for social purposes.

According to the Neo-Malthusian environmentalist of the Western World, the primary problem facing mankind today is over-population. According to many Third World radicals, it is World Poverty. The basic cause of this poverty is the world's exploitative politico-economic system The right question to ask about the future is, "How can we create the resources so that the people of the world as a whole can create a meaningful, productive economy answering to their own needs and purposes."

Human Rights

Structure reform of the World socio-economic system is a necessary prerequisite for the development of an effective, socially just, global policy dealing with the interrelated problems of world poverty, world environmental degredation, pollution, resource depletion and over-population.[20]

The struggle for human rights is the real essence of social change and what is needed are not solemn declarations but the possibility to exercise these rights in practice, in every-day life. The prerequisites for the real enjoyment of human rights are not only the laws issued to abolish all discriminations whatsoever,

so as to ensure the realisation of democratic human rights ; but at the same time a concerted action of progressive social forces is needed to overcome economic under-development and old traditions ; as a part of it, to overcome conscious or unconscious resistance to new relations between individuals in a given country. New relations between countries are also a fundamental requirement because it is wellknown that resistance to badly needed social change arises not only inside the countries but receives its impetus also from outside pressures

During the last few years, a new discipline of knowledge has emerged which is laying claims to predictive powers on a scientifically respectable basis. It is called futurology and one of its most impressive areas of investigation is the general problem of growth, particularly the exponential growth. The collected examples of such growth displayed during the last few years make even the so-called population explosion look rather bleak. In the perspective of scientific futurology the planet Earth has become *very small* as a result of the speed of certain technical developments and the deterioration of certain life preserving conditions and at the same time *very large*, in view of the task of disseminating a sufficient awareness and responsibility for peaceful and effective collaboration on a global scale.

The paradox of a rapidly shrinking world in the scientific dimensions of space, time and material resources on the one hand and a frightfully expanding world in the humanistic dimensions of the demand for general education and shared participation and responsibility on the other ; this paradox certainly confronts us with a bewildering dilemma at the level of practical action. Opinions differ as to how this dilemma could best be tackled and here it seems both justified and important, for purposes of a broad description, to speak about a scientific and a humanistic approach respectively. The existence of this dichotomy is frequently tangible enough but the implications thereof are rarely made explicit, perhaps because any such attempt is likely to stir principal and ideological matters of a rather cumbersome

nature. Most futurologists are putting forward a strong case for the probability of a major world catastrophe within a timespan of a few decades unless drastic steps are taken now in the basis of what today appears as hard scientific facts. However, if this notion would be indiscriminately acted upon, it would imply that a few knowers or experts should exercise their knowledge on the vast majority who have not had a chance so far to become sufficiently knowledgeable to understand what supposedly is required for their own benefit. In support of such policy, one would point to the remarkable achievements of science during the last hundred years which inspired a still powerful positivistic ideology in the industrialized world. There we still firmly adhere to what we call growth and progress by means of putting the hard facts of science into practice, the faster the better.

Sagacity in itself is simply not enough and here, something which we can only refer to as human nature, the subject of humanism, enters the picture. Whatever laws may be governing this human nature, in all its conceptual softness, to query itself, to exercise self-criticism and even to distrust itself and its own achievement. We cannot distrust science as such ; that would be meaningless, but we may, for very good reasons, distrust the way human beings are making use of science. Never have such misgivings been stronger and more appropriate than in our days. Never has there been such abundance of what Rabindranath Tagore called "the shameless pact between science and evil."[21]

The developed countries must not only give unprecedented aid to the under-developed countries ; they must help the under-developed countries to avoid the mistakes made by the developed countries. Something like this message must come across : " By making the fundamental error of basing our progress on expansion of the GNP, we have created a vast industrial complex and great mental, moral and aesthetic poverty. Our cities are disaster areas, our air often unbreathable, our people increasingly regimented, and our spirit increasingly

domitable. We require far too large a slice of the world's resources to maintain our way of life. We now realise that our current patterns of consumption and exploitation cannot and should not be sustained. While we are correcting our mistakes, and re-developing, we want to help you to semi-develop - not in our image but in whatever way is most appropriate for your culture."

What semi-development might mean in practice would of course differ from area to area. Certainly, ecologically sound agricultural development rather than industrialisation, should receive priority everywhere. In general, the developed countries would, where needed, supply medical services, educational facilities, teachers and especially technical assistance in population control. Roadways, electrification and communications adequate to the demands of an agrarian society, would be an almost universal need as it would help in developing improved local systems of agriculture.

The underdeveloped world today has an entirely different unfavourable demographic situation that differs markedly from the developed countries during their industrialisation. In addition, the underdeveloped countries face competition from the developed countries if they attempt to compete in the international market for manufactured goods. *Most of today's developed countries did not have vastly more advanced nations to compete with when they were developing.*[22]

The annual growth of per capita income in Latin America is less than two percent, in East Asia only about 2%, in Africa only 1% and in South Asia only about half percent. At these rates, a doubling of per capita income in East Asia would take at least 35 years, in Latin America more than 40 years, in Africa 70 years and in S. Asia nearly a century and a half. Even in the most progressive of these areas, the amount of improvement would be imperceptible to the average citizen from year to year.

Such a situation cries out for a greater and more urgent effort by the richer countries to assist economic growth in these poorer countries. It is clear they are financially capable of such action. During the development decade so far, they have added to their annual real incomes a sum of about $ 400 billion, an addition itself far greater than the total annual incomes of the under-developed countries of Asia, Africa and Latin America.

"But," says Robert McNamara, "I found and I hardly need to tell you this, that while the requirement for assistance was never higher, the will to provide it was never lower in many, though not all, of the countries which provide the bulk of economic aid.

Very little of the money lent in aid stays in the developing countries; almost all of it returns very quickly in payment for the goods purchased in the richer countries.

We shall try, in conjuction with other sources of funds, to help these countries to develop plans and to adopt wise and appropriate policies for development – in some cases by establishing resident missions as we have done in Indonesia – but always remembering that it is their country, their economy, their culture and their aspiration which we seek to assist.

Not only should our lending double in volume, and shift geographically, but we can forsee as well, dramatic changes among sectors of investment. Great increases will occur in the sectors of education and agriculture."[23]

Technologically advanced countries can make one of their greatest contributions by initiating a new order of intensity of research into reproductive biology. They have starved the research facilities of funds in this field. The result is that we are still only on the threshold of understanding the complexities of conception and therefore only at the outer edge of the necessary knowledge to help make family planning in the developing countries beneficial on a meaningful scale.

Annual worldwide expenditures for research in reproductive biology now totals roughly 50 million dollars. The hardheaded estimate is that the sum should treble to 150 million dollars annually–for the next ten years, if we are to develop the knowledge necessary for the most effective and acceptable kinds of family planning.

The parsimony in the matter in the U. S. is demonstrated by the discouraging fact, that out of a total budget of nearly one billion dollars, the National Institute of Health this year are spending less than 10 million dollars for research in population-related phenomena. Hundreds of millions of dollars for death control—scarcely 1% of that amount for fertilitity control. And research efforts should range far beyond biology.

Demography as a full developed science remains in its infancy. Similarly there is a pressing need for far more research in the socio-cultural aspects of family planning. There is manifestly a great deal more to population planning than merely birth control. Attitudes, motivation, preferences differ from country to country and this essential research can clearly be best conducted locally. The developed nations should be generous in their financial support for such studies and surveys.[24]

Bongaarts reviewed a non-technical report of the findings of a Massachusets Institute of Technology research team investigating the implications of continued world-wide growth. Although the team recognises that such a world model as studied by them is in some respects over-simplified and is based on necessarily limited knowledge, they are confident that their major qualitative conclusions are valid. These conclusions are :—

1. If the present growth trends in world population, industrialisation, pollution, food production and resource depletion continue unchanged, the limits to growth on this planet will be reached sometime within the next one hundred years. The most probable result will be a rather sudden and

uncontrollable decline in both population and industrial capability.

2. It is possible to alter these growth trends and to establish a condition of ecological and economic stablilty that is sustainable far into the future. The state of global equillbrium could be designed so that the basic material needs of each person on earth are satisfied and each person has an equal opportunity to realize his individual human potential.

3. If the world's people decide to strive for this second outcome rather than the first, the sooner they begin working to attain it, the greater will be their chances of success.[25]

National Justice

Recognition of international, social, economic and moral justice is not the only solution to the problem. Within the country itself, national justice is as much to be desired.

In this, as in several developing countries, the growth in national income remains in the upper layer of society.

In India, there are dominations at different levels. 10% of the Indian population own 56% of the land. They get 1/3 of the yearly income. One tenth own more than half the total wealth in the form of shares. 2% of the rural rich hold 25.7% of the rural wealth. As far as political domination is concerned, 87% of politicians come from an agricultural background owning a lot of land. Then in the administrative field, 80% of personnel of IAS and IPS* are drawn from the top 10% of Indian society. So, 90% of Indians are absolutely poor.[26]

Therefore, if we wish to improve the standard of living or the quality of life, the first sacrifices must come from our own people in India. We have to first shoulder our tasks and later look for outside help. At present it tends to be the reverse.

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* IAS, IPS, Indian administrative/Police Service

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POPULATION POLICY

— OPTIMUM POPULATION

What is Population Policy ?

An expert panel of the United Nations population Commission gave this definition of population policy :

"Population policy may be defined as measures and programmes designed to contribute to the achievement of economic, social, demographic. political and other collective goals through affecting critical demographic variables, namely, the size and growth of the population, its geographic distribution (national and international) and its demographic characteristics."

The Goal of Population Policy

The panel of experts made the following points :

— The ultimate goal of population policies is to *improve the general well-being of the population*; and not only to improve per capita income.

— A population policy must from *an integral part of an over-all development policy* and be explicitly related to such goals as better education, full employment and the rationalization of reproductive behaviour.

— It must always be borne in mind that there is a *two-way relationship* between the demographic variables in question and socio-economic development. For example, the rate of population growth may have a significant effect on levels of education and housing, but these levels also tend tc have a significant effect on population growth.

Population policies can be classified into :

— *Poulation-responsive* policies that will ameliorate or overcome the effects of unprecedented increase in population size and density, high birth rates and high population growth rates, and

— *Population-influencing* policies that will bring about a reduction in fertility and mortality and in growth rates, or will beneficially influence internal migration.

There are usually 2 conceptual levels at which population policy is generally discussed : *global* and *national*. The variables related to population differs in each case.

At the **global level**, the policy rhetoric encompasses at least 3 areas : population growth in relation to physical space on the earth ; population size in relation to life-giving resources, especially food, and population density and scarcity of resources in relation to the incidence of inter-group hostility and conflict. *The central concern of population policy at the global level is survival.*

The focus of disussion at the **national level** differs according to whether a nation is developing or developed. For the economically backward nations the basic concern is to catch up, or to close the gap between developing and developed. In these

instances, population policy tends to be discussed in the context of standard indices of economic and social development, such as size and quality of labour force; educational opportunities; level of mortality; growth of gross natural product and per capita income. Population policies are viewed as a means to raise levels of living toward the standards currently enjoyed by developed nations. For the nations that are already economically developed, on the other hand, population policy has came to be associated with enhancement of the quality of life beyond minimal standards of well being, with the achievement of a balance between man and his environment, with the elimination of class differentials in unwanted child bearing, the need for recreational facilities, including the preservation of wilderness areas; the problems of air and water pollution; the psychological stress resulting from crowding; the dangers of man's exploitative view of nature; the effects of social pressures towards necessary consumption; and the regimentation of life that is associated with population density.

Sensitive political issues are connected with population policies in both developing and developed countries. In the international context, charges are made that population control is a form of neocolonialism or white imperialism, promoted in the countries of Asia Africa, and Latin America to maintain a balance of power favourable to the Western nations. Within Nations, minority racial, ethnic or religious groups claim that they are the target of population policies designed by the majority, and raise alarms over "genocide."

At issue is the efficacy and adequacy of voluntary public family planning programmes, in comparison with other measures, such as legal administrative, or social actions. A leading critic (Davis 1967) argues that family planning programmes permit only a narrowing of the gap between desired family size and actual family size while *the real need is to change family size desires* or to enforce a lower rate of reproduction, because childbearing congruent with current desires would not represent an adequate reduction in population growth. He advocates

measures such as tax and welfare incentives and penalties, the provision of alternative rates for women, and legislative or other actions to bring about a higher age of marriage and changes in family structure. Berelson (1969) in a review on non-family planning proposals for fertility control concludes that none can currently be evaluated more highly than family planning programmes on the six critical dimensions of scientific readiness, political viability, administrative feasibility, economic capability, ethical acceptability, and presumed effectiveness.[1]

Cutting across the debate over means, is the ethical issue of freedom of choice. The heart of the question is whether choices made by individuals on the basis of personal utility can be compatible, ultimately, with the needs of the society as a whole (Hardin, 1968). At a practical level, specific proposals for fertility control can usually be classified according to whether they rely on :

(a) Voluntarism

(b) Inducement (positive or negative) or

(c) Compulsion.

While voluntary actions are widely accepted as an *ideal* some observers (e.g. Erlich 1968) argue that the *urgency of the population problem demands compulsion*

The concept of inducement may be regarded as a middle ground, whereby mechanisms such as tax relief for small families may bring about desired ends, while using means that preserve some measure of freedom for choice.

The interaction of means and ends must be also considered for e.g. family planning programmes designed only to permit women to have the number of children they want could have the important secondary effect, through psychological balance, of reducing the number of children desired.

Also as regards relationship between modernization and fertility change is it necessary for a Society to become modern, as reflected in a variety of social and economic indices, before large-scale fertility reduction can take place ? Can practice of contraception be among the first of the modern behaviours exhibited by a transitional population or must it follow from broader changes that would alter, for instance, the functions of children in the social orders ? Must urbanization first occur to make large families maladaptive before people will act to limit family size, or does knowledge and practice of contraception increase the likelihood of urban migration and facilitate the adoption of urban life styles ?[2]

Population policy should not be confused with population theory and practice. A population practice is simply what people do. A population theory is what someone thinks causes people to act as they do. **A population policy is what someone in authority thinks people ought to do and tries to implement**. The three are sometimes independent of each other, sometimes interrelated.[3]

The Global View

"Population policies, including the setting of objectives and targets, should be formulated mainly on the basis of national priorities, determined as a result of the study of national conditions and the need for achieving full employment," the U.N. expert panel on population stated. But there is an "increasing need for a global or world wide look at the problem of population growth and the international consequences of national policies. The world appears to be approaching a stage where not only individual decisions but also national decisions will have to be evaluated in terms of their interest of the world community."[4]

Since *Population Policy* "is the policy of the government concerned with the size, growth distribution and

control of their populatlon," different governments may focus on different aspects of the population problem. For example, in India, the government is chiefly concerned with the total size of the population whereas in Brazil it may be the growth rate which is the chief focus,

Governments have population policies for various reasons :—

1. Problem of Resources being inadequate.
2. Provision of Amenities, like transport, and housing because of overcrowding (Even England experiences severe congestion in its South-eastern part)
3. Socio-Economic Reasons. The size of the family has direct effect on social conditions.
4. Increasing Urbanization. The high rate of Urbanization and formation of slums and shanty towns when results of over-crowding and lack of facilities are immediately obvious.
5. Health facilities. Increasing population demands increasing health facilities and especially so for the 'vulnerable aged' groups.
6. National Pride–Political Reasons–to increase population of a country as a whole or within a country of a group/ tribe when increase in number is related to political power.
7. International Aid–often exerting pressure directly or indirectly on Governments to formulate policies.

A population policy may also be implemented with a view to increasing population, decreasing total population or only controlling the growth rate; so that rapid growth does not obliterate the improvements in socio-economic conditions which can keep pace with a more slow rate of growth of population.[5]

A population policy may be implemented by direction through various channels :

1. Through a health policy e.g. maternal health programmes whereby mothers are advised to adopt family planning spacing or limitation with a view to improving their or their children's health.

2. Through incentives in cash or other facilities for those who adopt family planning or by imposing penalties on those who do not.

3. Through social educational and legal reforms like Raising the Age of marriage, Education for Women, Premarital Counselling. Encouraging people not to marry and postponing marriage till the late twenties. *Abortion has also been used by some governments to control population growth.*

4. Making family planning methods easily available in every area.

There is a general agreement that a population policy could contribute to the acceleration of family planning programmes. The policy should be formulated with the collaboration of all agencies concerned, both public and private, with the role which each agency would play spelled out. Such a policy should be followed promptly by a specific programme with qualititative & quantitative goals whether short-term, intermediate or long-term. *The population policy should be an integral part of the country's development program e and should not be limited to the control of population growth alone.*

Regarding the organisational structure it was agreed that only a broad outline of a structure could be recommended as no one specific structure would fit all countries. At the top echelons, there should be a co-ordinating mechanism consisting of key government agencies, voluntary organisations and

influential people responsible to, and drawing authority, from the chief executive of the state, preferably with legislative sanction. Provision, for programme development, consistent with the state's population policy should be included. The Co-ordinating body should have a qualified person who is a 'generalist' rather than a "specialist", preferably with administrative or managerial competence, serving as programme director.

The programme should be implemented by existing governmental and voluntary agencies, each undertaking such aspects of the programme as would be commensurate to its strength or specialization at the national, regional and local levels.

A system of refusals could be built into the structure so that problems of various types could be referred to the agencies most competent to deal with them. The co-ordinating body should stimulate research required for the action programme and may support such research in appropriate Universities and institutes.[6]

Hitherto, population programmes designed to influence demographic variables, still remain in the early stages of development. Thirtyfive developing countries have adopted policies and organised national family planning programmes, most of them with the objective bring down high rates of fertility and population growth. The combined population of these 35 countries amounts to 1,990 million, equivalent to 78 per cent of the total population of the developing regions. *Most developed countries, and 60 or more countries in the developing world, have still to take the step of formulating explicit population policies.*

Government Policies and Development Strategy

Population policies cannot be considered separately from broader questions of development. A high level of social and economic development is generally accompanied by

a reduction in fertility. Without reduction in the rate of population growth, however, economic development may be severely jeopardized. At the same time without economic development and without radical transformation in the structures of society, reduction in the rate of population growth will be hard to achieve. Moreover, reducing the growth rate will not be enough to solve the problem of poverty.

All government policies aimed at economic growth and social development may affect fertility in some way, the U. N. studies indicate. Certain policies and programmes aimed at improvement in welfare may also lower the benefits and increase the costs of having children and therefore constitute policies for limiting fertility ; yet, other policies and programmes may tend to encourage fertility.

Official commitment to the goals and purpose of World Population Year could be matched by a parallel commitment to improve employment opportunities for women, and the status of women in general. Educational and employment opportunities for young women would give them an alternative to early marriage and childbearing.

Antonio Carrillo-Flores, Secretary-General of the World Population Conference, recently commented :

"Because the population variable is so pervasive, it cannot now be omitted from development planning..... Governments should equip themselves with the information necessary to make more detailed projections of population (by age and sex and geographical location, for example) and shorter-term forecasts of related demographic parameters, such as occupation and level of education, over the period of a plan... It would thus be possible to ensure that the objectives set for particular demographic parameters were mutually consistent and that economic and social policies were in line with population policy"

World Population Year programmes will probably include campaigns against the high infant and child mortality characteristic of nearly all less developed countries. Considerable reduction is possible through improvements in nutrition, inoculations against infectious disease and other public health measures. When average infant and child mortalities are high, the uncertainty faced by individual parents concerning the number of their children who are likely to survive is also high. Parents may compensate for this uncertainty by accepting the cost of having "extra" children. Thus, polices and programmes aimed at reducing infant and child mortality below present levels, and strengthening of health services generally, are essential underpinnings of governmental programmes for fertily control.

Governments may also want to consider how extending social security, old-age insurance and pensions may reduce the economic incentive for having children. Similarly, compulsory education and prohibition of child labour may reduce the benefits and increase the costs of having children, and thus produce a depressant effect on fertility.[7]

Psychological Aspects of Population Policies

Population policies, which are intended to bring changes in a population are dependent in part upon population theories, which attempt to explain how changes occur. The policies most clearly relevant for psychology are those dealing with fertility, although policies on migration and population distribution also have potential relevance, bringing that about. The boundaries of the topic "population policy" are not really clear, but the discussion below encompasses some of the major issues.

1. The question of desired social and individual goals.

Population variables may be regarded as one element in a broad conceptual scheme that relates the social system

and the physical environment to a hierarchy of social goals and values.

Population policy cannot reasonably be discussed without reference to social goals and values since changes in the rate of growth, structure, or dispersion of a given population will reverberate in many ways throughout the social system.

In the ideal case, a population policy could be lineally descended from a set of explicit, long-term social goals, and would therefore be part of a coordinated programme of planned social change. More realistically, a population policy takes into consideration the direction in which current social values lie, and will be related to some intermediate social goals that are congruent with those values.

2. The relationship of population to other variables

An essential step in developing a population policy is to determine the relationships between population and other elements in the social and environmental system.

Since population is one of the variables in any analysis of social or economic trends, there is no end to the list of possible interactions to be considered in a population policy. Still, it is only through persistent efforts to consider such interactions that intelligent policy decisions can be made.[8]

The Nature of Current Policies

With more than 30 nations now trying or planning to reduce population growth and with numerous private and international organizations helping, the degree of unanimity as to the kind of measure needed is impressive. The consensus can be summed up in the phrase, "family planning".

As is well known "family planning" is a euphemism for contraception. The family planning approach to population limitation, therefore, concentrates on providing new and efficient contraceptives on a national basis through mass programmes under public health auspices.

In those programmes the policy of "population control" is being achieved through the dissemination of new contraceptives, and the fact that the "target women" exclude those who want more children. One can also note the *technological emphasis* and the *medical orientation.*

When the terms population control and population planning are used, as they frequently are as synonyms for current family planning programmes, they are misleading. Technically, they would mean deliberate influence over all attributes of a population including its age-sex structure, geographical distribution, racial composition, genetic quality and total size. No Government attempts such full control. *By tacit understanding, current population policies are concerned only with the growth and size of populations.* These attributes however, result from the Death Rate and Migration as well as from the Birth rate; their control would require deliberate influence over the factors giving rise to all 3 determinants.

Actually, current policies labeled population control do not deal with mortality and migration, but deal only with the birth input. This is why another term, fertility control, is frequently used to describe current policies. *But, family planning* (and hence *current policy*) *does not undertake to influence most of the determinants of human reproduction.*

The ambiguity does not stop here, however. When one speaks of controlling population size, any inquiring person naturally asks, What is "control"? Who is to control whom? Precisely what population size or what rate of population growth, is to be achieved? Do the policies aim to produce a growth rate that is nil, one that is very slight or one that is like that of the industrial nations?

Unless such questions are dealt with and classified, it is impossible to evaluate current population policies.

Reduced Birth Rate as Goal

The actual programmes seem to be aiming simply to achieve a reduction in Birth Rate. Success is therefore interpreted as the accomplishment of such a reduction, on the assumption that the reduction will lessen population growth.

In those rare cases where a specific figure is stated, the goal is said to be a short-run decline within a given period. The Pakistan Plan adopted in 1960 aims to reduce the Birth Rate from 50 to 40 per 1,000 by 1970; the Indian Plan aims to reduce the rate from 40 to 25 "as soon as possible", and the Korean aim is to cut population growth from 2.9 to 1.2 by 1980.

One can of course defend the Programmes by saying that the present goals and measures are merely interim ones. A start must be made somewhere. But we do not find this answer in the population policy literature. Such a defence if convincing, would require a presentation of the next steps, and these are not considered. One suspects that the entire question of goals is instinctively left vague. A consideration of hypothetical goals throws further light on the matter.

Industrialized nations as the model

Since current policies are confined to family planning, their maximum demographic effect would be to give the under-developed countries the same level of reproductive performance that the industrial nations now have. The latter, long oriented toward family planning, provide a good yardstick for determining what the availability of contraceptives can do to population growth.

The Birth rates of most industrial nations have shown, since about 1940, a wave-like movement, with no secular

trend. The average level of reproduction during this long period has been high enough to give these countries, with their low mortality an extremely rapid population growth. If this level is maintained, their population will double in just over 50 years. The advanced nations are suffering acutely from the effects of rapid population growth in combination with the production of even more goods per person. A rising share of their supposedly high per capita income, which itself *draws increasingly upon the resources of the underdeveloped countries* (who fall farther behind in relative economic position), is spent simply to meet the costs, and alleviate the nuisances, of the unrelenting production of more and more goods by more people. *Such facts indicate that the industrial nations provide neither a suitable demographic model for the non-industrial peoples to follow nor the leadership to plan and organize effective population control policies for them.*

Logically it does not make sense to use family planning to provide national population control or planning. The planning in family planning is that of each separate couple. The only control they exercise is control over the size of their family. Obviously couples do not plan the size of the nation's population any more than they plan the growth of the national income or the form of the high-way network. At most, family planning can reduce reproduction to the extent that unwanted births exceed wanted births. In underdeveloped countries the reverse is normally true, but the elimination of unwanted births would still leave an extremely high rate of multiplication.

Goals not Pursued

Actually the Family Planning movement does not pursue even the limited goals it professes. It does not fully empower couples to have only the number of offspring they want because it either condemns or disregards certain tabooed but nevertheless effective means to this goal. One of its tenets is that "there shall be freedom of choice of method so that individuals can choose in accordance with the dictates of their

consciences, but in practice this amounts to limiting the individual's choice, because the "conscience" dictating the method is usually not his but that of religious and governmental officials.

Technology not availed of

Despite its emphasis on technology, current policy does not utilize all available means of contraception, much less all birth control measures.

Given the best of means, there remains the question of how many children couples want and of whether this is the requisite number from the standpoint of population size. That it is not, is indicated by continued rapid population growth in industrial countries, and by the very surveys which showing that people want contraception for these show, too, that people also want numerous children.

Designation of population control as a medical or public health task leads to a similar evasion. This categorization assures popular support because it puts population policy in the hands of a respected medical personnel, but, by the same token, it gives responsibility for leadership to people who think in terms of clinics and patients, of pills and IUD's and who bring to the handling of economic and social phenomena a self-confident naivette. The study of social organization is a technical field ; and an action programme based on intuition is no more apt to succeed in the control of human beings than it is in the area of bacterial or viral control. Moreover, to alter a social system by deliberate policy so as to regulate births in accordance with the demands of the collective welfare would require political power, and this is not likely to inhere in public health officials, nurses, midwives and social workers. To entrust population policy to them is "to take action" but not dangerous "effective action"

Similarly, the Janus-faced position on birth-control technology represents an escape from the necessity,

and onus of grappling with the social and economic determinants of reproductive behaviour.

On the one side, the rejection of avoidance of religiously tabooed but otherwise effective means of birth prevention enables the family planning movement to avoid official condemnation. On the other side, an intense preoccupation with contraceptive technology (apart from the tabooed means) also helps the family planners to avoid censure.

They avoid changes basic enough to avoid motivation for having children, would be changes in the structure of the family, in the position of women, and in the sexual mores.

Current population policies eschew any societal control over motivation. Its leaders, in avoiding social complexities and seeking official favour, are obviously activated not solely by expediency but also by their own sentiments as members of society and by their background as persons attracted to the family planning movements. Unacquainted for the most part with technical economics, sociology, and demography, they tend honestly and instinctively to believe that something they vaguely call population control can be achieved by making better contraceptives available.[9]

Present population control or Family Planning programmes are encouraging a downward trend in Birth Rate but to what extent and how important a factor it is as compared to other socio-economic-eductational factors that are associated with the downward trend is debatable. Will Family Planning provide the population control really needed ? How can it be associated with young women married and wanting more children ?

In Bangalore a city of nearly a million at the time (1952) of survey the number of offspring desired by married women was 3.7 on the average, by married men 4.1.

If Family Planning is the first step, what is the next step in Population Control ? For Family Planning cannot be assumed to be an effective means to control population growth.

Is reliance on family planning in fact a basis for dangerous postponement of effective steps ? To continue to offer a remedy as a cure long after it has been shown merely to ameliorate the disease is either quackery or wishful thinking, and it thrives most where the need is greatest.

Legislation like raising the age at marriage, is encouragement by Society to postpone marriage. In agrarian societies, postponement of marriage (when postponement occurs) is apparently caused by difficulties in meeting the economic prerequisites for matrimony, as stipulated by custom and opinion. In industrial societies it is caused by housing shortages, unemployment, the requirement for overseas military service, high costs of education, and inadequacy of consumer services. Little research has been devoted to the subject so it is difficult to assess the relative weight of the factors that govern the age at marriage.

In any deliberate effort to control the birth rate along these lines, a government has two powerful instruments – its command over economic planning and its authority (real or potential) over education. The first determines (as far as policy can) the economic conditions and circumstances affecting the lives of all citizens, the second provides the knowledge and attitudes necessary to implement the plans.

The economic system largely determines who shall work, what can be bought, what rearing children will cost, how much individuals can spend. The schools define family roles and develop vocational and recreational interest ; they could, if it were desired, redefine the sex roles, develop interests that transcend the home, and transmit realistic (as opposed to moralistic) knowledge concerning marriage, sexual behaviour and population problems.

When the problem is viewed in this light, it is clear that the ministries of economics and education, not the ministry of health would be the source of population policy.

Population Policy far from de-emphasising the family, is familitic.[10]

In the simplest statement of the case three essentials for a successful Family Planning Effort are :

1. An informed and motivated populace
2. Safe, Inexpensive, reliable, and convenient contraceptives;
3. A Programme to bring the above two together.

The contraceptives already exist ; the information and service programmes remain to be established more widely and firmly.

The objective of Family Planning is the enrichment of human life, not its restrictions ; that Family Planning, by assuring greater opportunity to each person, frees man to attain his individual dignity and reach his full potential.

With this and other considerations in mind and with the conviction that present rates of population growth are detrimental to individual and family welfare and constitute major hindrances to the attainment of development objectives, the Government believes that voluntary planning of the size of families and reductions in the rates of population growth are in the vital interest of the nation and proposes that a national policy be adopted to advance these interests.

The principal elements in such a policy may be defined as follows :—

I A national population policy and programme are to be developed as organic parts of social and economic

planning and development activity. Details of programmes are to be formulated through the collaborative participation of national and regional entities, both public and private, and representatives of relevant professions and disciplines.

A population policy and programme are viewed as integral parts of efforts towards social and economic development, improvement of health and nutrition, elevation of quality and extension of the scope of education, wider employment opportunities. and better development and use of human resources in the interests of a more abundant life.

The guidance and advancement of a contraceptive population programme will require the participation of medical organisations, educational institutions, employers and labour organisations religious bodies, the houses of chiefs and regional entities.

II Specific and Quantitative population goals will be established on the basis of reliable demographic data and the determination of demographic trends. To this end steps will be taken to strengthen the statistical research, and analytical facilities and capabilities of the Government and of public and private educational and scientific organisations.

A sustained, intensive and co-ordinated programme of public information and education, using all media and a variety of techniques is required.

III Women — Non Domestic Role, Stimulation and Encouragement of employment, Participation in community affairs and non-home related activity.

IV The government will adopt policies and establish programmes to guide and regulate the flow of internal

migration, influence spatia distribution in the interest of development progress, and reduce the scale and rate of immigration in the interests of National Welfare.

V Decentralization – Integrated National and Regional Policies.

VI Rural Life made more attractive by provision of hitherto city priveleges. Eg. Piped Safe Water.

Sufficient importance must be paid to the significance of the following which also directly or indirectly encourage large families.

1. Lowering of Infant Mortality by a comprehensive Programme of infant and child welfare.

2. The provision of Old Age pensions or some form of financial security to the aged whose numbers gradually increase in the developing countries due to better health conditions. If security in older ages is provided then one reason that exists for early arrangement of marriage will disappear to keep the property and money (however little or meagre) in the family. Therefore, parents want to be assured that their sons will marry according to their choice and fulfil the above need.

3. Urban and Rural Development. – Resources be used with the greatest possible efficiency : for eg.

   Concentrated investments

   Integrated Services

   Administrative Coordination

   Social and Economic Investments made complementary

   Concentration of Economic Activity in those places that offer the best conditions for economic and social development.

4. Teaching and Research in Demography for continuity, expansion and strengthening.

5. Promotion of *national committees on Government Coordination* attached to planning offices to correlate the work of the Sectors.

6. International Co-operation between agencies of Family Planning and Family Welfare."

The Theory of an Optimum Population

The concept of "optimum population" is being resurrected as part of the current concern about environmental pollution and depletion of resources. Some of the difficulties encountered in determining an optimum population are for e. g. the necessity for value judgements and the complex interaction among emperical variables of different kinds. Another source of confusion is the distinction between static factors such as size, and dynamic factors, such as rates of growth, both of which must be considered in the context of limitation imposed by the existing size and structure of a population.

One of the most stubborn tendencies in popular thought about population is to refer to countries or regions as overpopulated or underpopulated. Elementary logic suggests that there must then also be a state in which the population in some or other has just right size – the size of the *optimum population.* In the present state of affairs, nothing is easier than to show how impossible it is to argue that density alone is a major factor in determining economic prosperity. No matter how it is measured, density is high and low in countries that are poor and rich, without the slightest systematic tendency.

Such comparisons as all other comparative international study, raise the serious question of how meaningful it is to adopt the nation's state as a unit of economic analysis. To

compare India or U.S. averages with those of Guinea or Switzerland on the basis of nation-wide averages is in part a concession to indolence. But it is also a recognition of the existence of the policy of a community held together and separated from the rest of the world by a shared culture and a political structure, and not merely by a more or less accidental boundary.

It is quite plausible that in very sparsely settled countries, a larger population would be better able to avail itself of its natural resources. There would be economies of scale, the division of labour would be facilitated by greater density of settlement, transportation cost would be smaller, and so forth. Beyond a certain point, diminishing returns might set in and these advantages of a larger, population vanish, but for the time being, if the " optimum " population seems larger than the actual one, it is easy to believe that population growth can constitute no problem. In one form or another, this argument was reflected in many of the replies received by the Secretary-General of the U. N. in his enquiry about governments' views of their population problem.

The central flow in this argument is that it is vague on the role of technological change and capital formation, which will displace the point of " optimum " population even while the actual population is moving towards it ; if there is any relationship at all between the rate of change of population and the rate of capital formation and technological change, then the fastest way of raising incomes per head is not necessarily to increase population at an all-out rate, even where there are increasing returns to labour. In some conditions it certainly may be, and these may be reasons to encourage immigration at a maximum rate, but if population growth competes strongly with capital formation, then the " optimal rate of growth " of population will be below the maximum, although it will be higher than under diminishing returns to labour.

Older population thought was not growth conscious ; its concern since Malthus and before was with the size of populations. By and large, however, size seems to be of subordinate importance. Neither the present nor even the future size of population constitutes a major economic problem – after all, we can say with certainty that a transition to lower growth rates will come in the next century no matter what is done to encourage it now. The real problem is the excessive rate of growth which impedes the process of modernization. This problem is no less acute in sparsely settled African or Latin American countries, than in the most crowded Asian regions.

The demands for social and institutional adjustment in transition from a traditional agricultural economy to an urbanized industrial society are high in the best of circumstances, and they are compounded by present growth rates. The most obvious and probably the most serious example is the failure to absorb the growing labour force. Its absorption in the rural sector is held up less by shortage of capital than by the slowness with which methods of cultivation are changed and new lands settled Inputs of capital, e. g. in the form of education, extension work, etc step things up—but at a cost and not indefinitely. The resulting exodus to the cities aggravates the situation there which would be critical enough without it.

Unemployment in the large cities of the developing world is staggering. Apart from the waste that this implies and that a poor country can ill afford, and from the deprivation it entails, it is a serious threat to the minimum of political stability that development policy requires[1].

In this context, time itself has a cost, and what anyone concerned about development prospects must wish for is a breathing space and a let-up in the demographic pressure. This conclusion points in the same direction as the discussion of capital requirements and only reinforces the arguement it will not explicitly be taken into account in the following.

There are many weaknesses in the notion of an optimum population, but from the analytic point of view the most serious one is that it assumes both technology and the supplies other factors of production to be constant. In the context of an underdeveloped country which is attempting to appropriate an existing technology, the first of these assumptions may be acceptable. What is more serious in the treatment of capital. To begin with, the assumption of an unchanged amount of capital immediately makes the vision of a larger population considerably less attractive even in the most wide-open country. To imagine a population enlarged with a simultaneous and proportional increase in its existing amount of capital equipment is one thing. The benefits of a larger population spreading a given amount of capital among its members is an entirely different matter. Increasing returns to labour might nevertheless still arise.

However, at the same time as the population increase, capital is also formed. Now, the rate of capital accumulation and the rate of population growth cannot be assumed to be independent one of the other; upto a certain point, population expansion is likely to stimulate investment, but if the rate of population growth is very large the dependency burden will reduce savings capacity. The lower rate of capital formation associated with very rapid population increase will offset the benefits realized from increasing the ratio of labour to land. There will then be an "optimal rate of population growth" even in territories which are so sparsely settled that one is tempted to call them underpopulated. Moreover, the same reasoning will apply when there are decreasing returns to labour, for these will be offset by capital formation which is assumed to be stimulated by some population growth.[12]

To say that "excessive population growth is bad" is to imply that some other state of population growth would be good or better, e.g. a 2 optimum level of population But as the demographic discussion of an "optimum" has made

clear, so many variables come into play that it may be possible to do no more than specify a direction "the desirability of a lower rate of growth"[13]

Population Fluctuations

It is probable that the size of the human population of the developing country and of the world will level off eventually.

For an established population the population fluctuations may be regular or irregular.

There is as yet no general theory to explain these population fluctuations.

One hypothesis which seeks to explain them is as follows :

There is an increase in the mortality rate when the population increases. The increase in mortality rate may be immediate or delayed. A delayed response of this sort can lead to large fluctuations in population size.

Another hypothesis which seeks to explain these population fluctuations is as follows : During the rising phase of a population cycle, genetic variation has full play and natural selection is minimal. Then, an environmental change sets in, and natural selection has full play. As a result, the population crashes.

The amount of fluctuations in the size of population of wild animals is very small when account is taken of the potential amount of fluctuations. Such stability in the size of population of wild animals must be due to density – dependent factors, affecting fertility rate or mortality rate.

Populations have become extinct. Several species of animals and plants are in danger of becoming extinct as a result of human activity.

Each ecological niche has its characteristic population of organisms.

Concept of Zero Population Growth

In international literature we frequently come across the concept of "zero population growth." The underlying idea of this concept is that in individual countries, as well as in the world at large, population figures should be stabilised as rapidly as possible. In the long run this would mean that the average number of children every woman should have would be slightly more than two. In many European countries this has been more or less achieved.

This average would lead to stable population growth only if the population structure is balanced and "normal" over a long period of time. If, for example, India were to strive to achieve a zero population growth today, each couple would have to have less than one child on the average, whereas after one generation many more than two children would be necessary in order to maintain stable population figures. Zero population growth can be achieved only over a longer period of time. This would be devastating

Is Zero Growth Rate economically the best ?

If we are looking at the rate of growth of per capita income as our sole measure of welfare, then the answer would be yes. If we look at total income then in the short run the answer would still be yes, though a time eventually comes when this is no longer so. Finally, an important point to make is that all the argument is in terms of trying to achieve the largest growth of national income - either in total or per capita terms. *However, the measurement of national income does not include the joy that parents get from having children. It is difficult to see how this can be measured but beyond a point there is obviously a clash*

between individual and social welfare. Both for this reason and because of the fact that few would be prepared to accept per capita income as the only measure to be maximized and to attach only minor importance to other factors, developing countries might aim at bringing down their Birth Rates approximately to those of the developed countries. Beyond this a further decline would be questionable.[14] As really sound, it has been argued that since the world population cannot grow infinitely, we should begin at once to stabilize it at its present level. This argument seems to be of little value in itself, because it can be applied at any time in history. Moreover, one can say that at all times and everywhere in the world the size of the population has always been as large as it could be under the given conditions. This general statement will also apply to any future population size.[22]

The experts (U.N.) say that zero population growth (ZPG) is inevitable as a long run proposition, short of natural disaster ; man may bring it about deliberately and by acceptable means (mainly by controlling births) or through undesirable means (such as increased mortality). However, while it is not unrealistic to expect ZPG to be achieved in many developed countries in the foreseeable future, such an expectation would be quite unrealistic in regard to the present developing countries.

Doubt was expressed about the feasibility of setting a precise goal for an over-all world population growth rate by the end of the century. But the expert did consider it advisable that global targets should be set in terms of replacement level reproduction rates, and that a **global plan of action should** be designed to help implement these goals, with target dates varying by region or type of countries.[15]

In the drawings of a conclusion we can consider the statement of the Beirut Conference, (April 27, 1967) on "World Cooperation for Development"

In the field of political action, the Conference recommends that the following priorities be stressed for action during the seventies :

A **In the Developed Countries.**

1. That a commitment to genuinely unrequired and productive transfers of resources equal to 10% of the GNP be made by the developed nations, if possible by 1970, without prejudice to an increase latter.

2. That a flow of private investment equal to at least another 10% be aimed at by that time.

3. That the rescheduling of debt be accelerated and the terms of credit be eased for the future.

4. That manpower for technical assistance be systematically expanded to match the increase in financial transfers.

5. That the UNCTAD resolutions on stabilizing the prices for selected primary products and on preferential access to developed markets be achieved by mid-decade.

6. That programmes and policies pursued by developed countries respect the genuine needs and priorities of developing countries - reformed agriculture, not higher defense, labour intensive industries, not industrial giants working at a quarter of capacity, schools and clinics, not prestige projects, the advancement of all the people not the monopoly of the few.

7. That the needs of developing countries be given higher priority in all the new schemes for international liquidity.

In the Developing Countries.

1. That removing the social and political obstructions to dynamic progress and bringing all the people into the efforts and benefits of modernization be given the highest priority in local political action.

2. That programmes for the modernization of agriculture and appropriate policies to slow down accelerated population increase — policies which respect the rights and religious beliefs of each family be given the priority they need ; to lessen the prospect of possible famine in the next two decades and to give the hope of better diets, health, education and responsible family life.

3. That in the industrial and service sector priority be given to appropriate technologies, including where suitable, labour-intensive enterprise, and strategies be reasonably related to the availability of local resources.

4. That education be geared to an adequate concept of the nation's needs for citizens with modern attitudes and capacities, with special reference to agricultural, technical and managerial training.

5. That all plans be linked to a systematic mobilization of financial resources by way of adequate taxation and stimulus to local saving.

6. That regional common markets be established to coordinate industrial investment so as to enlarge the base for effective, industrialization ; to increase the competitiveness of exports and to secure a steady increase in trade between developing nations.

Developed and developing peoples alike are to be concerned with more than their own policies and reactions. They are all members of a wider, ever more interdependent world economy.

All would benefit if the lawlessness of the world were reduced and men's energies turned from preparations for war to the works of peace. Both in development and in the pursuit of peace, men can underline their common partnership and commitment by steadily increasing their resort to international institutions and agencies.[16]

"Time and again, we are brought back to a key question"

"What is the true end of men ? Is it to populate the Earth with a maximum number of human beings that can be kept alive simultaneously by the world's maximum food supply ? or is it to enable human beings to lead the best kind of life that spiritual limitations of human nature allow ? The first of these two possible objectives seems irrational. What matters, surely, is not that the surface of the planet should hold say 4,000 million instead of 3,000 million living human beings. What matters is that living beings, whatever their number, shall develop to the highest capacities of their nature ; and, if this is the true end of men, what we should aim at is the optimum size of population for this purpose in the economic and social circumstances of each successive generation".[17]

India's Population Policy

Historical Note :

Thinkers were preoccupied with the relationship between population and society long before useful demographic observations could be made. Thus Confucius in China and Plato in Greece formulated more or less exact laws concerning the evolution or desirable composition of the population. In his laws, Plato recommends an ideal city of 5,040 citizens, this having the quality of containing a large number of divisors, which would permit the organisation of a large number of categories of population sub-groups : each such category would correspond to a division of goods and social work.

Much closer to our own day, the great Moslem thinkers Ibn Khaldun (1332–1406), made the point that a sufficiently dense population makes for better utilization of the workers because of the possibility of specialization of tasks and the greater ease with which political and military security can be assured. Elsewhere, the same author advances

the theory of the cyclical fluctuations of populations in relation to the fluctuations of the economic, political and social situation.

Several other authors later applied themselves to defining the relationship between population and subsistence by emphasizing the effect of the latter on the former. The most famous of these authors, Malthus, formulated the 'Principle of Population' which provides the first coherent basis for a population policy[18]

Plato and Aristotle also considered optimum population (with ideal conditions) of a city-state as one in which the potentialities of a man could be fully developed and his "highest good realised".

In the case of India, demography was not a very live subject for study till the late twenties. A number of factors seem to explain the reasons for indifference. First, the rate of growth of India's population was modestly low and had not caused any alarming situation. Second, the British Government of India had an attitude of indifference as far as a rational policy of population control was concerned. It was generally held that an increase in the population of His/Her majesty's "subject" in India would enhance the country's prosperity which would be creditable to the ruling class. Third, the Government at that time was involved with many other economic and political pre-occupations and consequently the question of population was thrown into the background.

Lastly, the rulers did not want to take up the delicate question of framing a population policy because therein they apprehended the political repercussions unconducive to their interest

Inspite of such a feeling of indifference at the Government level, the enlightened section and the intelligentia was conscious of the problems of indiscriminate population

multiplication and the ensuing repercussions. As a result of their foresight and prudence, some developments took place on the Indian social screen. In 1925 Prof. R. D. Karne opened a birth-control clinic in Bombay. In 1928 the Neo-Malthusian League was formed in Madras. In 1936 the first population conference was held in Lucknow under the auspices of Lucknow University. The same year Dr. A.P. Pillai-started a journal Marriage Hygiene, which Margaret Sanger called "the only scientific journal in the world," on the dissemination of knowledge of conjugal hygiene. In 1938, the Second All India Population and the First Family Hygiene Conference was held in Bombay under the presidentship of Prof. R. Mukerjee. In his presidential address, Prof. Mukerjee delineated the factors and consequences of population growth and made a forecast about India's future population.

The Indian political leaders side by side with their struggle for liberation strongly supported the need for a population policy in India and Gandhi stressed the importance of "self-abstinence" for family control. The National Planning Committee (1937) under the chairmanship of Pandit Jawaharlal Nehru recommended the control of births in the interest of family happiness and planning. In 1938 Subhash Chandra Bose in his presidential address to the Congress Party emphasized the need for a policy of population control. It is worth a reference here that during this period the policy of population control was advocated more from the individual's stand-point than from national considerations. The enhancement of family welfare was the central goal of the birth control policy. After independence in March 1950, the Planning Commission was appointed to make an assessment of the material, capital and human resources of the country and to formulate polices for the most effective and balanced utilisation of the country's resources. Consequently the question of the appraisal of population growth and its consequences attracted the attention of the framers of the plan. On April 1951 the Panel of Health Programmes of the planning Commission appointed a Committee to report on 'population growth and

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India

family planning.' This Committee in turn appointed two sub-committees viz —

(1) The Population Policy Committee and

(2) The Population Research Programmes Committee.

The former recommended (to the government of India) research schemes relating to family planning and the latter regarding analytical research activities pertaining to population. Besides, a family planning cell was also created in April 1952 in Planning and Development Section of the Directorate General of Health Services. In 1956 the Central Family Planning Board was created and in the same year an Officer on Special Duty (later called Director) for Family Planning was appointed in the Health Directorate.

The Central Family Planning Board appointed a sub-committee (1956) on demographic study under the Chairmanship of Dr. V. K. R. V. Rao. One of the main recommendations of the subcommittee was the establishment of research centres in different parts of the country for the promotion of demographic investigation. As a result, demographic research centres were started in Bombay, Calcutta, Delhi and Trivandrum in 1956 – 57.

However, as far as the population policy was concerned, although the objectives were clear, the aim and the targets were not well defined. The control of population "by the reduction of birth-rate to the extent necessary to stabilise the population at a level consistent with the requirement of the economy" was considered a major desideratum by the framers of the first Five Year Plan. But the goals and means were still not spelled out. The Census Commissioner (for 1951 census of India), however, picked up the thread where the Planning Commission left and wove it into a systematic framework with a well defined goal. The goal was defined, "as to limit the number of births that they do not numerically exceed the number of deaths and

thus achieve a substantially stationary population before our number exceeds 45 crores". On the issue of means the Census Commissioner suggested to put an end to "improvident maternity". (a birth occurring to a woman who has already given birth to 3 or more children of whom at least one is alive).

The First Five Year Plan as a matter of fact laid down the broad scope of the population policy. For the Plan a sum of Rs 6.5 million was allotted for conducting research in fertility and family planning. This allotment was increased to 30 million during the Second Plan period. During the First and Second Plan period (1951-61) at least a couple of dozens of family planning attitude and fertility surveys were conducted in different parts of India by institutes, universities and individual scholars. Though such surveys were not carried out either under a unified direction or in a co-ordinated uniform manner, yet they provided a picture of the generalised opinion of the Indian masses. The results of these surveys dispelled the belief which once very much haunted the imagination of the masses that there was something in the tenets of religion (Hinduism or Islam) against family planning. It was also ascertained that a small family pattern was the felt choice of most of the Indian community and that the people were prepared to welcome any such move which may help them in restricting the size of the family.

For the Third Five Year Plan (1961–1966) a provision of Rs 270 million was made for the family planning programme of which demographic research was an important constituent. During the Fourth Plan (1969–74) an outlay of Rs 3000 million was allocated for family planning. During 1966-69 the expenditure incurred on family planning was around Rs 750 million. In the fourth Five Year Plan also, demographic research has been taken as an integral part of the overall family planning programme.

Fertility surveys combined with KAP studies (knowledge Attitude and Practice) are being carried out to evaluate the ultimate and intermediate objective of the programme.

The Fourth Five Year Plan oultine has referred to family planning as 'the kingpin of the plan' and "limitation of family as an essential and inescapable ingredient of development" The high priority attached to family planning is reflected in the formation of a cabinet Committee with the Prime Minister Smt. Indira Gandhi as the Chairman. Similar Committees have been formed in most of the States also.

A department of family planning has been formed within the Ministry of Health and Family Planning. Currently a Cabinet Minister is in overall charge with a Minister of State guiding the programme. As the objective, the aim is to reduce the present rate of population growth estimated to be at 2.5%per annum to about half of it by 1978–79 through assisting the voluntary efforts of birth control.

The first systematic attempt to ascertain the population by actual counting was made between 1867 and 1872 (at different dates in different areas) The 1881 census was a more complete and synchronous one.

Among the developing countries India is one of the few having elaborate information relating to population statistics and among the Asian countries she illustrates the only solitary example (apart from Pakistan which was carved out of India in 1947) of an uninterrupted decennial census history of a century old. Though she exemplifies some of the major difficulties besetting heavily peopled rural economies of the world yet her statistics have been not so unsatisfactory. There lies, therefore, a reason to appreciate the efforts of collecting demographic data and conducting research, particularly, when she accommodates over one-sixth of the global population. Any examination of the world demographic situation without a proper appraisal of the Indian population would be incomplete.

In 1958 a permanent census department-office of the Registrar General and ex officio Census Commissioner of India was established at New Delhi.

The 1971 Census Questionnaire which comprised :—

(i) The Houselist

(ii) Establishment Schedule

(iii) Individual Slip and

(iv) Population Record, claimed to be the pioneer in a couple of respects : for the first time sampling methods were applied to the tabulation of the data and the traditional manual tabulation was partly reduced by computer processing.[19]

A lingering doubt concerning implementation of family planning policies regarding contraception and abortion is that with time (some-times comparatively short) some countries are forced to reverse their policies and then find it difficult or even impossible to do so.

For example "One European country with a long history of free abortion – Czechoslovakia has recently begun to tighten its liberal policy."

Recently, the government has begun to apply pressure to control the number of abortions, concerned by the fact that the Czechoslovakia population has remained stable at about 14 million for the past decade.

Under a new policy issued in July of this year, the committee members are instructed to grant abortions only in cases of what they consider true necessity. It is reported that Japan is also suffering from lack of man power today, as a result of a low birth rate.[20]

I conclude with the statement of the Secretary General of World Population Conference in "Conference Focus" who says :— As mankind has been capable of extending the average life expectancy in many developing countries to 60, and

even to more than 60 years, the challenge is to establish a new equilibrium by bringing down the birth rate with due respect to the dignity of the family and fundamental rights of the individuals and not through maintenance of high rates of mortality. Reduction of fertility is extremely difficult but it is the only road the world as a whole can take.[21]

There is no doubt whatsoever that a Population Policy is a useful tool to have. If it can be formulated and implemented in a comprehensive manner for the good of the country concerned, it can bring to the fullest development – the **whole human family. Concern for the individual and the family should be the basis of any decision made by the anthorities and should be implemented with the consent and participation of the people concerned, with due respect for the quality of living and the destiny of man.**

PART II

POPULATION & HEALTH

THE HEALTH SITUATION IN INDIA

"**Health is a dynamic state.** Its development embraces every aspect of the maturation process, including its physical, biological, and social aspects. To bring about healthy development and to realize human potential is the basic aim of health services."

In considering the subject of "*Population & Health*" one must first consider it on a *macro level.*

This would include a discussion on—

I The State of Health in India

and

II The Health Problems in India

Health Problems in India

No country has ever faced, or is likely to face, the health problems that India has had to and still does. No country, including China, has the multiplicity of barriers to health care that make India unique in more ways than one.

A growing population ; largely dependent ; with many languages and hundreds of dialects, make the Government's task to provide comprehensive health care extremely difficult.

Whereas 80% of our population live in our villages only 20% of doctors choose to work there. As such the average of one doctor for a population of 5,100 is deceptive because there are many tracks in the countryside where the doctor/population ratio is as low as 1 : 50,000.

In India as in other Asian countries, both the Birth Rate and the Death Rate were high till the end of the II World War. Thereafter, the accumulated technical health knowledge of the West (chiefly insecticides, vaccines and antibiotics applied on a mass scale) brought the Death Rate rapidly down in a few years. However, the Birth Rate did not follow suit. The result was a sudden spurt in the size of the population.

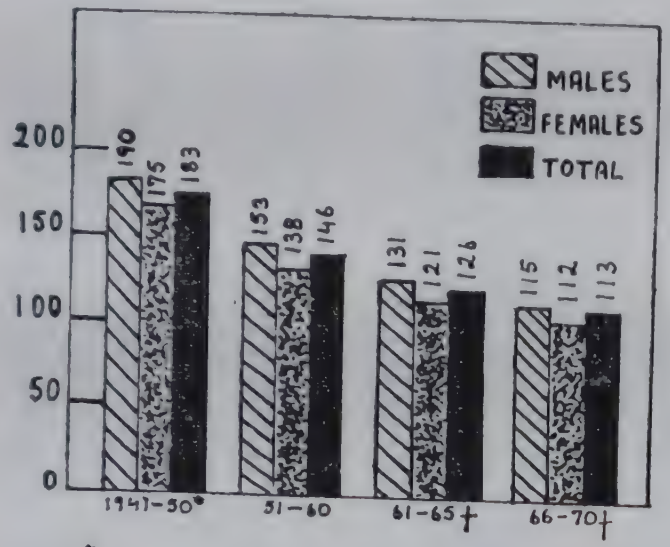
In the short span of just over two decades :

* The life expectancy has shot up by as much as 18 years
* The infant mortality has been reduced to almost one half
* The death rate has been slashed by fifty per cent.

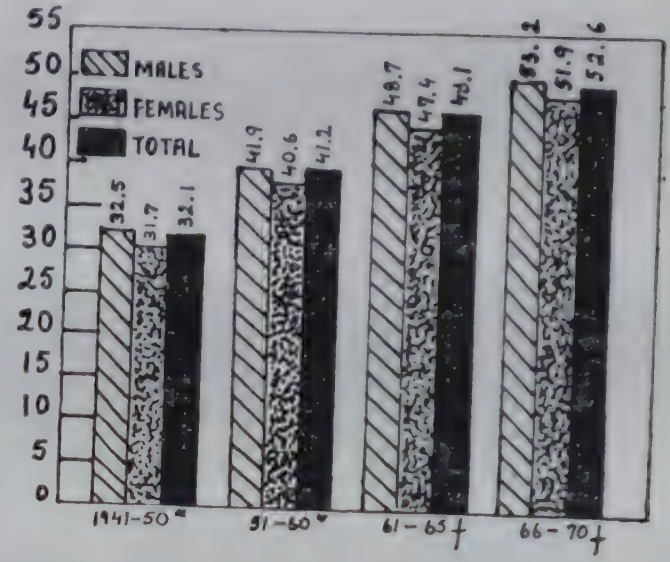
Generally speaking, in India people become aware of their health only in times of illness. Unfortunately the excellent system of Ayurvedic medicine has not been given sufficient attention as regards research, extension and application.

VITAL HEALTH STATISTICS

ESTIMATED INFANT MORTALITY RATE PER 1000



EXPECTATION OF LIFE AT BIRTH



* = CENSUS ESTIMATES

† = ESTIMATES BASED ON PROJECTIONS MADE BY THE EXPERT COMMITTEE ON POPULATIONS SET UP BY THE PLANNING COMMISSION IN 1964.

Modern Western or allopathic medicine is increasingly considered the best form of medicine even in situations where cheaper and as effective medication can be provided under Ayurveda.

At the same time people are generally resistant to preventive measures against deficiency or infectious diseases. The recognition of the relationship between environment and health is limited to the educated minority.

The population in one rural area surveyed showed that only 4% of households had latrines and 12% had a protected water supply. When it is estimated that approximately 1/3 of all morbidity and mortality is due to lack of pure drinking water and poor sanitation, the seriousness of the situation is even more significant.

Three Five Year Plans have been completed since Independence. The Fourth Five Year Plan ended in March 1974. In the current Plan 2.7% of the total Plan outlay has been earmarked for Health.

Health is a State subject. However, the Centre has sponsored special programmes such as for Smallpox and Malaria eradication and for Tuberculosis, Leprosy, Filariasis and Family Planning. In 1967 there were 110,884 physicians, 59,914 nurses and 65,589 midwives.

There are 0.4 hospital beds per 1000 population in India and 100 Medical colleges producing about 12,000 doctors a year.

There are over 5000 Primary Health Centres each with 2 or 3 sub-centres spread (some unequally so) in our villages where 80% of India's 547 million (as on 1.4.1971) people live!

A comparatively inexpensive way to promote optimum health is the provision of immunization services for infants and children. Diseases like Tetanus (responsible for 1

out of 4 deaths in rural areas), Smallpox, Tuberculosis, Typhoid, Cholera, Poliomyelitis, Diptheria, Whooping Cough and Measles can be controlled and often, some of these diseases can be eradicated.

The importance of Preventive Medicine has not been recognised sufficiently. Bigger and more highly specialised equipment is obtainable in sophisticated urban hospitals and clinics, whereas the rural areas which contribute 70% of the G.N.P. get only 30% in the way of health services.

In Rural areas the following diseases or conditions pose a special problem due to lack of education, orthodox practices (some of which are obstructive to health practices), and lack of proper personnel to work in the villages:—

1) **Tuberculosis** : "The tuberculosis problem in the country was assessed by a National Sample Survey during 1955—58. The survey covered a population of about 3 lakhs, spread over 6 large cities, 30 towns and 151 villages, situated in 6 different zones in the country.

The Survey was carried out with mass miniature radiography and sputum examination by smear and sputum culture of those showing any chest pathology.

The Survey showed :—

1) that tuberculosis was widespread in the country and there was hardly any difference between the rural and urban areas (formerly the rural incidence of Tuberculosis was urban incidence),

2) roughly 1.5% of the population had the disease on X-Ray examination.

3) about 0.4% were sputum positive.

4) the disease was more in males than females.

Based on the above estimates there will be at least 9 to 10 million cases of pulmonary tuberculosis in the country of which at least 2 million are infectious.

Tuberculosis is a disease for which effective immunisation is freely available though not fully availed of in India. Due to over-crowding in homes, malnutrition, atmospheric pollution and poor working conditions in textile mills, the disease is more prevalent in the poorer sections of the population.

It is estimated that about 0.5 million deaths are caused by Tuberculosis every year.

Health insurance only covers government employees and industrial workers. A tubercular patient outside these categories can rarely be treated effectively.

2) **Tetanus** is prevalent in the rural newborn due to sepsis at the time of delivery and in cutting the umbilical cord. Also in farmers who though especially vulnerable, are not protected routinely with tetanus toxoid which is an excellent preventive measure against contracting tetanus.

In a recent survey in the Punjab the perinatal mortality due to Tetanus alone in 6 villages was 20.3/1000 live births (which is the total perinatal mortality in the U.K.). This was reduced within a short period of 6 months by 60% using only aseptic care and hygenic measures at the time of delivery and the dressing of the cord thereafter.

3) **Dysentery, Diarrhoeas, Parasitic Infections** leading to debilitating conditions, malnutrition and anaemia are largely caused by poor food hygiene and environmental sanitation. In crowded homes and where babies are not breast fed the water for feeding or utensils often carry infection.

4) **Respiratory Infection** — especially in children and the aged due to droplet infection in overcrowded houses are common and include Pneumonia and Bronchitis, often fatal in children.

5) Other diseases like *Malaria, Leprosy and Filariasis* are endemic in certain areas.

6) **Malnutrition** in the vulnerable population, i.e. infants and children up to 15 years and nursing mothers who constitute approximately 60% of the total population (1 - 5 year olds form 15% of the total population).

It would perhaps be fitting to mention the role played by the *National Malaria Eradication Programme* in reducing both the morbidity and mortality that the dreaded disease Malaria caused. Malaria also reduced the work productivity by 22% in India.

"The idea of worldwide eradication was put forth in 1955 and in India it involved the recruitment of about one hundred thousand people, the establishment of local manufacture of D.D.T., and the spraying of all houses and constructions and surroundings lived in by some 200 million people, repeated three times a year.

However, one major fact was not anticipated or dealt with by the malariologists. That is, with the lowered morbidity and mortality the fertility of women in their reproductive age, hitherto checked by malaria now went unchecked. In addition children were now kept alive to suffer from "Malnutrition".

This indicates the lack of comprehensive planning on the part of the Government, the experts, Indians and foreigners who saw one side of the picture.

If you save people from illness and death you have the responsibility to ensure that they have enough food to stay alive, and not save them from one disease only to die from another.

Thus hunger and malnutrition forge a chain of conditions that only spiral the total human performance dismally

India 1967. Causes of Death

TABLE

Percentage contribution of specified causes of death to total deaths (Males and Females combined)

Cause		Age-Group (years) 0-1	1-4	5-14	15-34	35-54	55 and over	All ages
1.	Diarrhoea (dysentery, gastro-enteritis and unclassified)	6.4	17.7	12.6	6.3	7.0	6.2	8.8
2.	Broncho-pneumonia, pneumonia and bronchitis	19.4	23.5	12.0	6.5	10.0	10.5	14.2
3.	Tuberculosis (all forms)	0.9	0.3	2.7	15.5	16.8	5.5	5.6
4.	Malaria	0.4	0.7	0.7	0.4	0.6	0.6	0.5
5.	Smallpox	1.6	4.6	4.1	0.5	0.2	0.1	1.4
6.	Measles	2.0	5.4	3.5	0.2	0.1	0.1	1.6
7.	Typhoid	2.0	7.2	12.2	9.1	4.7	2.0	4.5
8.	Unclassified fevers	7.4	16.0	16.2	10.8	9.9	9.2	10.5
9.	Tetanus	5 3	1.6	2.8	2.4	1.3	0.3	2.2
10.	Other infections of the new born	7.2	—	—	—	—	—	—
11.	Total specified causes	52.0	77.6	66.8	51.7	50.6	34.5	49.3
12.	All causes	100.0	100.0	100.01	00.0	100.0	100.0	100.0
13.	No. of deaths	5165	3147	1497	1988	2545	7130	21,472

Source : Computed from : *Report on Survey of Cause of Death 1966 and 1967. New Delhi 1970.* (Office of the Registrar General, India).

downward. Alertness, vitality, energy, the ability to learn, the desire to succeed, the will to exert an effort — all these inestimable human qualities drain away.[3]

Gopalan (India) has estimated that 50% rural children do not attain their full genetic potential due to protein malnutrition.

From data available in 1938 there appear to be significant differences in infant mortalities in different countries. It is highest among Indians, Hungarians, Poles, Bulgarians and Czeckoslovakians and lowest among Australians, Norwegians and Dutch. When the countries involved in the survey are arranged in groups on the basis of increased intake of calories in potatoes and cereals, the mortality rates show a striking inverse relationship. And, in passing, the same relationship is observed on the average expectation of life in years — that is, those people taking in the highest percentage of calories from potatoes and cereals tend to have the shortest life-span and vice-versa.[4]

Mortality in India & Health Care

From the table one can clearly see the pattern of mortality and how it differs from that in Western Society; in that in India as in most developing countries preventable diseases, associated with unsatisfactory and unhygienic housing, water supply and food are the major culprits in both morbidity and mortality disease incidences, where as in the West, social factors and the diseases of civilization are the chief causes of death.

Though maternal and child health was developed in India in as early an age as 400 years B. C. and our great physician and surgeon Charak & Sushruta, respectively, gave detailed directions for the woman to observe during pregnancy and childbirth and later for the care of the child in many rural

areas today certain unhealthy and even positively harmful problems prevail. For example, certain foods are forbidden (such as eggs, meat, fish) during pregnancy. The village midwife or dai often cuts the umbilical cord with unsterilised instruments and cowdung ash is used as a cord dressing often causing tetanus infection.

The prevailing good habits like breast feeding and oil massage for the child are good and should be encouraged.

The education of the pregnant mother in nutrition is necessary to safeguard her own health and that of the baby. The need for proteins and minerals in the diet must be emphasised. The fact that babies are born "small for date" or of low birth weight and that this can lead to increased morbidity and death must be stressed. Also that this state can be avoided by adequate nutrition of the pregnant mother.

The use of Tetanus Toxoid in antenatal period should be more widely advocated.

The use of trained midwives and health visitors should be increased and rural midwives (Dai) given training and encouragement.

The antenatal period is an ideal time in which to educate the pregnant mother and her husband in health matters. She will be amenable to suggestions and advice and is likely to follow them closely.

It is in this period too that advice on spacing and limiting of her children can be given. The idea that it is in her's and her husband's hands to decide and plan their family is the kernel of responsible parenthood and should be developed to the point of action on their (parents) part. Ideally in India perhaps the efforts should be concentrated on the 4 or 5 million women who bear their first child in a given year and have the greatest residual potential for adding to the population and on

the 20 million women who are currently prengant. The population of women aged 15 - 44 years is nearly 20 - 22% of the total population. 85% of these women are married. The percentage of births of 6th order and above is about 22.8%. (India census 1961).

Children in large families may suffer more maternal deprivation because of greater maternal illness and the stress of large numbers of children on the mother. By contrast in the West children suffer because of the increasingly poor quality of family life, materialism, illegitimacy and divorce.

It is a widely accepted fact that the health of mother and children is endangered by excessive pregnancy. There is a deflnite corelation between number of pregnancies and maternal and infant death rates. A study of mortality rates in India (hospital records) has shown that both maternal and prenatal mortality are lowest in the second and third pregnancies, begins to rise in the fourth and more sharply after the fourth.

The patterns of child-bearing are variable, They represent the complex outcome of long term interacting social or biological experiences. The problems of the regulation of reproduction and child bearing are highly complex at the level of the individual, the family, the community and the nation and have important implications at the regional and international levels. This complexity is related to the fact that reproduction has both personal and social implications. Nevertheless high fertility rates and high mortality rates have gone together in the past and it is still true that most high fertility countries have high mortality rates.

These countries are usually socially and economically underdeveloped and the complications which occur to mother and child are often the result of an unhealthy social and physical environment. At the 21st World Health Assembly the Director General stated that "a minimum level of health seems to be necessary for a family to realise that it can regulate its

HEALTH CARE FOR CHILDREN

BASIC PRINCIPLES OF INDIVIDUAL AND ENVIRONMENTAL HYGIENE.

NUTRITIOM AND IMMUNISATION

EDUCATION AND LOVE.

HEALTHY CHILD
WITH POSITIVE ATTITUDES
AND A MATURE PERSONALITY.

↓

READILY EMPLOYED

↓

SATISFACTORY SOCIO ECONOMIC STANDARD

↓

GOOD BASIS FOR FORMING OWN FAMILY

↓

HIGH ASPIRATIONS FOR OWN CHILDREN

↓

MODERNISATION ACHIEVED

↓

POSITIVE INFLUENCE IN COMMUNITY.

↓

FINDS IT ADVANTAGEOUS TO MAINTAIN
MODERNISATION
ACHIEVED FOR QUALITY OF LIFE

↓

MOTIVATFD

↓

TOWARDS
SMALL FAMILY SIZE.

↓

FERTILITY DECLINE.

demographic behaviour." Parents must be convinced that their offspring will survive.

We now have data from Africa and increasing from India to show that acceptance of family planning tends to be related to positive attitudes towards survival.

In other words "Family planning will not be individually accepted until optimal pregnancy outcome is ensured by a reduction in foetal, infant and childhood mortality. In developed countries the reduction in mortality rates caused by improved public health and medical services has already been accompanied by a gradual decrease in family size."[5]

Family Planning should be advocated as a means of improving the nutrition of mothers through the spacing of pregnancies or improving family nutrition by limiting the the number of children so that all can be cared for.

Advice need also be given on time at which births occur, particularly the first and the last, in relation to the age of the parents, especially the mother.

The role of the man as husband and father has hitherto been paid insufficient importance. Masculine pride in large numbers of offspring and male heirs has not been taken into account as an important social factor in determining family size irrespective of the family economy, wife's desires and health and the needs of the existing children.

While developing countries increasingly look to modern medical technology to use themselves, it would be well worth considering the "diseases characteristic of modern western civilization." In an article thus entitled, Burkitt lists: Appendicitis, Varicose Veins, Deep vein thrombosis, Pulmonary Embolism and Haemorrhoids.

: Diseases associated with Cholesterol metabolism include Coronary Heart Disease and Gall stones.

Obesity (40% of the people in Britain are said to be overweight), Hiatus Hernia, Thyrotoxicosis, Pernicious Anaemia, Rheumatoid Arthritis, Multiple Sclerosis and Coeliac Disease.

There is also increased incidence of Dental Caries, Lung Cancer, Emphysema, Mental Illness and Hypertension.

Most of these diseases can be related to changes in diet, stress and mental tension both at work and in the family. The increase of sugar (especially) and fat consumption; the reduction of fibre in the diet and the preference for white refined flour is in Burkitt's opinion, responsible for changes in intestinal behaviour and content, resulting in disease.

Education of the public in the protection of their own and their childrens's health and in the principles of human development is of great importance. It is best accomplished on the basis of individual teaching in an atmosphere of mutual understanding and trust. The health worker must consider the entire range of multiple factors that influence human development. This education should be carried beyond the family to leaders of opinion in the community who are responsible for or influence the setting of priorities. It should also be carried into the school, and the health worker should encourage the collaboration of teachers, students and parents in the dissemination of health information.

Health is not a problem to be considered on its own. It affects man through many ways. It is not only an individual or national problem, it is a global problem.

At the 1970 East African Medical Research Council Scientific Conference Prof. L. J. Bruce-Chwatt said "The recent technological and scientific triumphs of Apollo 11 and Apollo 12 are another mark of the Phenomenon of man" in a different sense from that given to this term by Teilhard de Chardin.

In July 1969 countless millions of people on this globe saw the first footsteps of men on the moon. The modern means of communication exceeded in volume, range and speed anything that we have known before.

The picture of Armstrong's ghostly figure putting his heavy bootted foot on the surface of the moon involved us in the future of mankind but the same involvement was felt by many of us when we had before our eyes the face of Nigerian dead or starving children, the burning body of a Buddhist monk in Vietnam, the war in the Congo, the Sharpeville shootings, the Pinkville massacre, the tragedy of Czechoslovakia, or the riots in Chicago, Belfast or Tokyo.

These sights and sounds shake our complacency, challenge our faith in human progress and give us all a feeling of shame and doubt and guilt. In a world where the scientific and technological achievements command admiration we are witnessing an intolerable degradation of the human being.

Our pride at belonging to a generation that for the first time since the genesis of man set foot on another planet cannot disguise the terrible truth that it may be easier to travel to the moon than to erase from the surface of the earth the old ghosts of disease and poverty, war and persecution or the new plagues of the pollution of air, water and soil by man's technical progress".

The background to the health problems considered both internationally and within the national governments has been outlined by the World Health Organization (1967).

The main aspects of the present situation can be briefly outlined as follows :

1. The environment is being rapidly changed by man. Industrialization, urbanization and migration create problems of water supply, land spoliation, housing

shortage, waste disposal and pollution. Irrigation schemes, mining, motor transport and nuclear energy create special hazards. The speed and volume of international travel - a new social phenomenon of our times - will have a serious impact on the health aspects of many nations.

2. The pattern of disease continues to change but the great communicable diseases so aptly called les grandes endemies by the French are still with us. Malaria, trypanosomiasis, schistosomiasis, cholera, leprosy and tuberculosis are prevalent over large areas of the world. The diseases of the ageing pollution : cancer, cardio-vascular affections, bronchitis, rheumatoid arthritis are prominent in developed countries and mental disease and drug addiction are on the increase.

3. Material resources devoted to health are short of the needs, while the demographic pressure and the changing age-structure of the population drive them steadily upwards. The cost of medical care is so heavy that many countries are reviewing their needs with a view to achieving better results. Many of them have to make the difficult choice between the ideal wanted by a few and the attempt to save the many.

4. The expansion of health services outplaces the supply of trained manpower in developed countries while in developing areas there is not only a greater shortage but also no reservior of people with adequate general education to draw upon for higher education in health. (This is more true of Africa than India). The brain drain of trained scientists and doctors from the poor to the rich countries is one of the paradoxes of our time.

5. The acquisition of new knowledge has been going on at a frightening pace. New insecticides, vaccines and drugs are changing the prevalence of many diseases but create

at times new syndromes. In many diseases multifactorial causation is now obvious and it is more difficult to assess the simple cause and effect relationship. It is possible that improvement in world health could be attained if more attention could be given to the application of existing knowledge rather than to gathering new scientific facts. And yet there are many diseases in which the technical means are insufficient for their cure and control: a single major scientific discovery may give us new tools applicable on a large scale.

"Human development covers all spheres of human activity. In order to be authentic, it must be complete and integral; that is, it has to promote the good of every man and of the whole man". [18]

THE INDIVIDUAL AND HEALTH

In considering the subject of "Population and Health" at a *micro level* we can discuss it as it affects the *individual* family and its members.

Firstly, let us consider the meaning and extent of he word "*Health*". (As defined by the W.H.O. CONSTITUTION)

"Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity.

"The enjoyment of the highest attainable standard of health is one of the fundamental rights of every human being without distinction of race, religion, political belief, economic or social condition.

"The health of all peoples is fundamental to the attainment of peace and security and is dependent upon the fullest co-operation of individuals and States.

"Unequal development in different countries in the promotion of health and control of disease, especially communicable diseases, is a common danger.

"Healthy development of the child is of basic importance; the ability to live harmoniously in a changing total environment is essential to such development.

"Informed opinion and active co-operation on the part of the public are of the utmost importance in the improvement of the health of the people.

"Governments have a responsibility for the health of their peoples which can be fulfilled only by the provision of adequate health and social measures."

If we consider this comprehensive interpretation of Health we can see that few developed countries, if any at all, are wholly healthy. However, we should aim for the attainment of the state of positive or optimum health in every individual and to start this process at the earliest level *possible*, i. e. the prenatal stage.

The constitution and personality of a person is determined by two factors and their relationship or interaction with each other, namely the *Environment* and *Heredity*. A child inherits his genetic character directly from his parents each of whom in turn inherit from their parents and so on. A Child is thus born with inherited characteristics, which if given a suitable environment can bring him to the full development of his potential; if not, it will leave him deficient or defective in one aspect or another.

Health is therefore a dynamic process. Its development embraces every aspect of the maturation process including its physical, biological, psychological and social aspects. To bring about healthy development and to realize the human potential is the basic aim of the health services.[1]

Heredity — Genetics — Eugenics

In 1956. Tjio and Levan reported the now universally accepted fact that the normal human body cell contains 46 chromosomes, i.e. 22 pairs of body chromosomes or autosomes and one pair of sex chromosomes, (XX in the female, XY in the male.)

Chromosomes are rod–like condensations of chromatin. They occur in pairs; one member of each pair comes from the father and the other from the mother. The largest chromosome measures about 7 M and is about 5 times the length of the shortest. Biochemically, the chromosomes are made up of desoxyribosenucleic acid (DNA) and they consist of genes. A gene occupies a specific position or locus on the chromosome. Each human being has about one million genes.

If genes which also occur in pairs are alike (AA), the individual is described as homozygous for that gene ; if dissimilar (Aa) the individual is described as heterozygous for that gene.

A gene is said to be dominant when it manifests its effects both in the heterozygous and the homozygous state. A gene is said to be recessive when it manifests its effects only in the homozygous state.

One interesting example of genetic function is seen in the structure of the different blood groups.

Blood Groups

Early genetic studies centred round blood groups in man. Blood Groups are determined by genes. At present 14 blood groups systems have been discovered in man ; the well-known ones are the ABO and Rh blood groups.

ABO System — The genotypes and phenotypes in the ABO system are shown in the Table

Gene 0 is recessive, the red blood cells of a person whose blood group is 0 have no antigens.

Genes A and B are co-dominant; when both are present, the red blood cells carry antigen — A and antigen — B. Blood groups provide valuable evidence in cases where there is a question of true parentage; they are also extensively used to determine whether twins are identical or not.

TABLE 1

GENOTYPES AND PHENOTYPES IN ABO SYSTEM

Genotype	Phenotype (Blood Group)	Approximate Frequency in Indian Population
OO	O	40%
AA	A	22%
AO	A	
BB	B	33%
BO	B	
AB	AB	5%

Picture of Genes { Normal / Abnormal

Rhesus System

The Rhesus System depends upon 3 genes which are designated by the letters, C, D and E and their alleles by the small letters c, d and e. The Rh antigens develop very early and have been demonstrated in a 38 day old foetus. It has been established that the Rh antigens are present only on the surface of the red cells.

The possible genotypes in the rhesus system will be CDE, DCe, cDE, cDe and cde. The diploid individual inherits any two of these units, e.g., CDe/cde of the rhesus antigens, the most potent is the antigen D ; so much so, the term "Rhesus Positive" has come to mean possessing this antigen and Rhesus Negative lacking it. In India it is found that about 93% of the population are Rhesus positive as compared to 85% in countries of Northern Europe and North America. The importance of the rhesus system in preventive medicine is exemplified in the fatal disease in the newborn, Erythroblastosis Foetalis.[2]

Human development embraces every aspect of the maturation process, including its physical, biological, psychological and social aspects. To bring about healthy development and to realize human potential, it is necessary to draw upon many areas of scientific knowledge and many components of the health service. Such areas as nutrition, communicable diseases, human reproduction, mental health, handicaps, and many others, together with the corresponding services, are related to human development. Many of these services have their greatest impact on development when they are employed early in the individual's life.

Genetic Factors

Growth and development are the result of interactions between the genetic information contained in the zygote and the environmental variables encountered in the course of time from fertilization through birth to adulthood.

The development programme, constituted by the set of instructions coded in the DNA of genes along the chromosomes and in other cellular structures, is determined at the time of fertilization, together with all the genetic characteristics of the organism. Mutations occur, from time to time, usually for known environmental causes such as radiation. Slow

modification of gene frequencies is occurring all the time under the influence of natural selection.

The way in which the instructions written in DNA are translated into enzymes and other protein structures that result in the complete individual is now known; however, knowledge of the sequence of elementary events leading to differentiation and growth is fragmentary and inadequate.

Family studies, pedigree analyses, and twin studies confirm the great importance of inborn factors in determining differences between individuals. For example, the correlation between intelligence levels in monozygotic twins remains high even if they are reared apart. Nevertheless, the action of the environment on the way in which genetic endowment is expressed gives ample scope for modification.

Eugenics

Galton proposed the term Eugenics for the science which aims to improve the genetic endowment of a human population. The 'Eugenics' is derived from the greek 'eugenos', which means born well. It encourages the carriers of desirable genotypes to assume the burden of parenthood. At present, positive eugenics has very little application because we do not fully know as yet how the genes with which one is born could be improved and also we cannot determine which gene we transmit to our children. The adapting of environment by man to his genes is known as *Euthenics* and is an important part of Eugenics.

Genetic inheritance is determined by a Darwinian expounded theory known as "natural selection"

"Darwin's beautifully simple and clear definition of natural selection was preservation of favourable variations and the rejection of injurious variations (1859). Natural selection is a sequel to the struggle for existence. This struggle includes not only the life of the individual but success in leaving progeny.

The emergence of genetics has shifted the attention of evolutionists to the transmission of genes from one generation to the next. Selection occurs when the carriers of some gene variants leave more or fewer surviving descendants relative to the carriers of other variants. Or to put it differently, natural selection is differential perpetuation of genetic variants from generation to generation.

Natural selection takes place when a population contains two or more geno-types with different Darwinian fitness in the environment in which the population lives. Darwinian fitness is reproductive fitness. "[4]

Natural selection is the prime mover of evolution. It is essentially the differential reproduction of genetic types. In all human populations, individuals differ from one another because each individual has a different hereditary endowment. Natural selection can cause one kind of genetic information – for example, that producing people with blue eyes - to become more and more common in the gene pool of population. These changes in the gene pool are what is called evolution.

Thus the statement that an evolutionary premium was placed on brain size is a convenient shorthand for a statement that might go like this : in early human populations there was variation in brain size. This variation was in part caused by differences among individuals in their genetic endowment. Individuals with slightly larger brains were better able to utilize the cultural information of the society. This permitted them more ready access to mates, a better chance of surviving, or perhaps a better chance of successfully rearing their offspring ; and they reproduced more than did individuals with smaller brains. The result was a gradual increase in the genetic information producing larger brain size in the gene pools of human populations. In turn this increased the capacity for storing cultural information and produced a selective advantage for further increase in brain size. The key thing to remember is that natural selection is differential

reproduction of genetic types. It may involve survival but differentials in reproduction may occur while the life expectancies of all genetic types remain identical. [5]

Natural selection has no foresight. It selects what is advantageous, and has a high Darwinian fitness where and when the selection operates. In short, natural selection is opportunistic.

It seems intuitively obvious that the adaptivity of present mankind is superior to that of mankind of palaeolithic times, or of australopithecine ancestors. One can also surmise that uncontrolled population growth and despoilation of the world's environment may seriously lower man's adaptedness.

The pattern of mating is one determinant of how genes are combined in genotypes in human and other bisexual populations. Mutation, gene flow, selection and genetic drifts are usually considered to be a complete list of the systematic modes of change of gene frequencies for a generation and knowledge of the pattern of mating we can in principle predict the distribution of genotypes of that generation. [6]

The detection of genetic carriers for *Haemophilia, Phenylketonuria aud Galactosaemia* can be very helpful and often life-saving. More and more screening tests are being devised for detection of genetic disease. In consanguinous marriages genetic counselling can be of great use.

Genetics counselling is the most immediate and practical service that genetics can render in medicine. It is estimated that at least 4% of live-born individuals suffer from some genetic or partly genetic condition and might benefit from genetic counselling. [7]

A greater sense of responsibility in marriage partners on one hand and the application of probability calculations to the laws of heredity on the other, make more and more easy

and advisable a genetical consultation from a preventive point of view, that is to say Eugenic Counselling.

Now, Eugenic calculations require an appraisal of the health of yet unconceived offspring, presumed to be born, according to the average of hereditary diseases in a population. Therefore, the census of a population's genetical structure forms a basic starting point for the development of Eugenics, hence the need for the functioning of premarital consultations.

A phenomenon accompanying consanguinity and often endogamy is the high frequency of abortions and stillbirths. In fact, both consanguinity and endogamy render more frequent a recessive homozygosity and thus the appearance of hereditary diseases with recessive mechanisms. When such diseases are lethal they show themselves precisely in abortions and stillbirths.

The increase in the average life-span for the man of today and, thus, in individual life expectancy, is due above all, to the great decrease in infant mortality and to the means at the disposal of preventive and therapeutic medicine in the struggle against infectious diseases. For other diseases life is ensured by hormones, vitamins, surgery and X'Ray Therapy.

Many hereditary diseases or predispositions, which, In the past menaced life, now barely affect the health of their bearers and that of their offspring.

In other words, the progress of medicine produces the fact that many individuals who, some time ago, would have in infancy or by puberty have died, are now alive and capable of reproduction.

Population Genetics considers this fact. "It is the science which examines the genetical structure of the various populations and its possible variations from one generation to the other.

The genetic structure of a population consists in the frequency of the genes which control both the normal and the pathological characters of the examined population

A population of sufficient size in conditions of panmixia maintains, according to the Hardy-Weinberg Law, a a constant genic structure, i.e. practically the same anthropological and pathological data from the qualitative and quantitative viewpoints.

There exist, however, factors which modify the panmictic balance; these are mainly:

1. A large quantitative change of the population.
2. A qualitative change due to the absolute or relative prevalence of one part of the population.
3. A differential fertility due to the fact that given individuals are unable or unwilling to reproduce as much as the average of couples.
4. Consanguinity
5. The choice of a marriage-partner when this systematically concerns the bearers of a certain character.
6. Mutation.
7. Migration; that is to say when a notable rate of immigration or emigration exists.[8]

The Environment

The environment – natural or man-made, physical, chemical, biological, and social—has a significant effect, whether direct or indirect, on human development. While scientific knowledge of the environment is growing, there is still much to be learned about its immediate and long term effects on

human development. Furthermore, current knowledge is not always applied, or not used in the best way to improve the quality of human life. There still exist numerous environmental hazards that could be at least partially controlled.

The child experiences a series of developmental phases and transitional events, each of which represents a different relationship to the environment. In the foetal phase, when the uterus forms the immediate environment, dependence on the mother is total. After birth, the infant remains in close physical contact with the mother. If breast-fed, as in most developing countries, the infant is carried by the mother during much of the day and lives in an environment that preserves excellent temperature control, provides high-quality nutrition, and confers protection from most infection. In industrialized countries where standards of personal and environmental hygiene are satisfactory, the substitution of artificial feeding for breastfeeding is certainly compatible with very low rates of infant mortality. Whether such substitution is equally compatible with completely satisfactory emotional and metabolic development remains to be seen : some workers suggest that the dietary composition of artificial feeds may be partly responsible for degenerative circulatory, and other diseases in later life, and that separation from the mother-especially when enforced, as with the isolation of low-birth-weight infants in sterile cubicles - may predispose towards subsequent emotional disturbances.

When the child can no longer be fed on a diet consisting entirely or mainly of breast milk, and when he becomes too heavy to be carried conveniently and too active to be kept at his mother's side or in some other relatively safe special environment, he is exposed for the first time to the normal adult environment of his family and community. In some cultures, weaning is abrupt and also marks a change of attitude towards the child ; if the child is brought up to behave passively, his behaviour pattern will sooner or later have to be reversed, and this reversal may be very harsh.

If the environment of the community is grossly unhygienic, the child is exposed to a host of infectious agents that he is physically unable to withstand. Such exposure, with modifications, continues throughout life, but children who survive the initial encounter with infection and infestation acquire their own defences of active immunity. For millions of people in poor countries, the hygiene of the physical environment remains extremely unsatisfactory and dangerous. The absence of adequate facilities for the disposal of excreta accounts for the high prevalence of bacterial, viral, protozoal, and helminthic diseases. The lack of a plentiful, convenient, and safe water supply complicates efforts to maintain a sanitary environment, to keep food clean, and to practise good personal hygiene. Overcrowding and lack of ventilation predispose children to a host of airborne infections. Despite notable advances in control, insect vectors continue to be major sources of infection in many parts of the world.

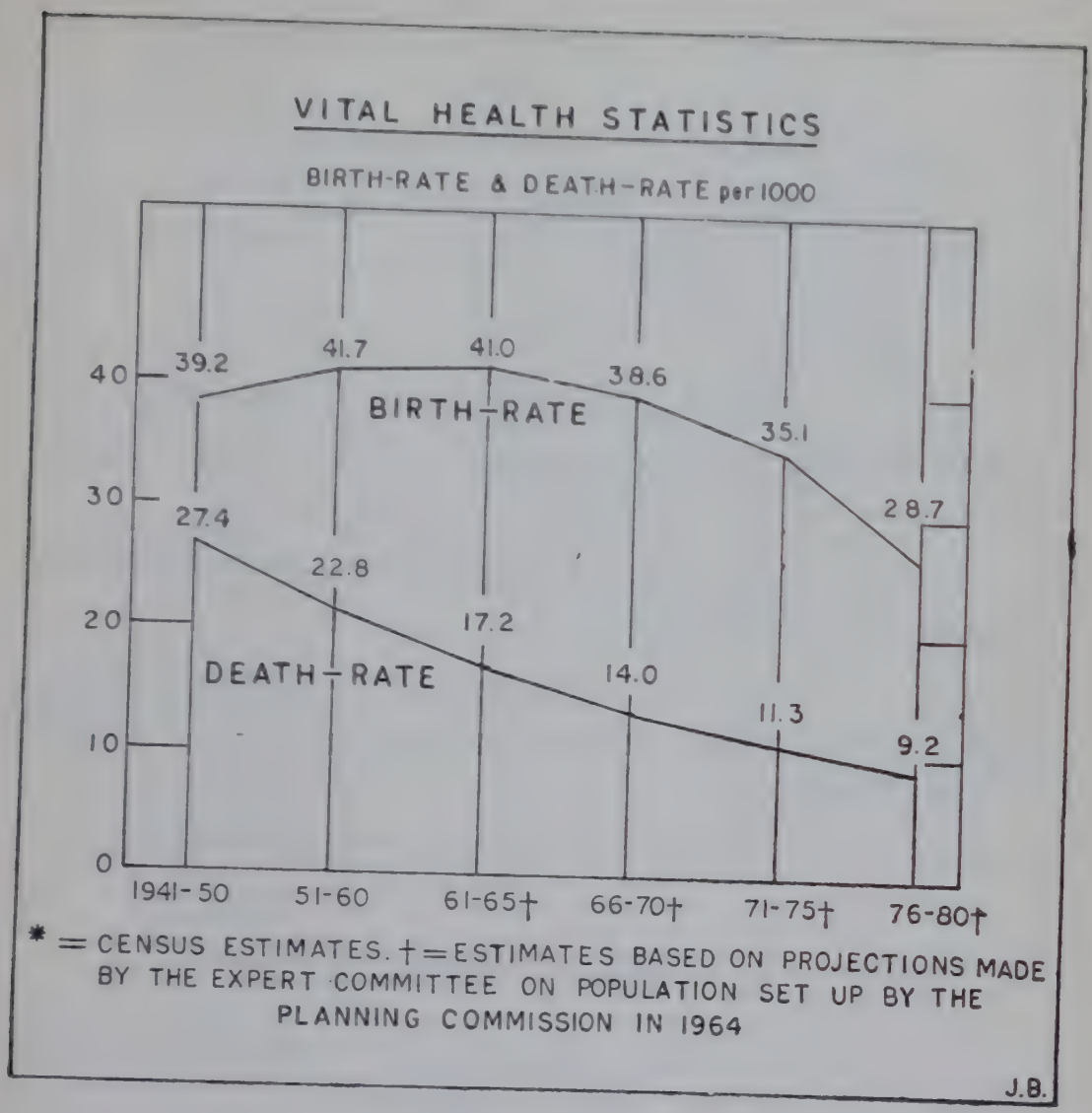
It is worth recalling that modern health programmes began in the nineteenth century with environmental hygiene, which was used to combat many waterborne, airborne, and other kinds of infection at source at a time when there was interminable and often fruitless speculation about the nature of epidemic diseases and their relation to sanitary, meteorological, and geophysical conditions. In the twentieth century, science and technology have solved many riddles regarding the origin of disease, but have introduced a host of new problems. Release from the necessity for physical effort has committed man to a sedentary way of life; commercial production of food has exposed him to refined foods and food additives; industrial expansion has subjected him to chemical and other pollutants; and the mass production of pharmaceuticals has exposed him to the use of drugs, sometimes for non-medical purposes.

The principal requirement for healthy growth and development is good nutrition. Closely related to this is the requirement for measures to prevent infections; to be effective, such measures must be taken early in life and pursued in later

years. Human development is favoured at the outset by the careful management of pregnancy and by the practice of family planning. For those problems of mental and social health that have their origins in childhood, early preventive an educationalth measures help to forestall or obviate problems in adulthood. Certainly the early detection and treatment of handicapping conditions will improve the long term prospects for almost all children with handicaps. The precise role that factors in childhood play in the degenerative diseases of later life remains to be fully explored, but there are already indications that some factors are important.

The promotion of healthy development cannot be achieved by measures that derive from any single health discipline, nor can health measures be considered independently of the broader educational, social, economic, and administrative factors that are crucial to human development. Health measures aimed at promoting biological development - especially the control of infection, the improvement of nutrition, the management of pregnancy, and family planning - can improve the health of people ; higher levels of health in turn contribute to socio-economic development.

Until recently, one of the main goals of maternal and child health (MCH) services was the reduction of infant and child mortality. Governments and W.H.O. gave a high priority to this task and achievements have been substantial. In many places, where mortality rates during early life are still high, the prevention of perinatal, infant, and child deaths remains a principal aim of many MCH activities. With the reduction of mortality rates, however, the health of the survivors becomes a growing concern. It was at one time assumed that if a child survives he must be well, but studies of the health of survivors now show that even when mortality rates are falling, many health problems remain unresolved. In fact, there is evidence that many children do not attain their full development potential because of adverse environmental factors before and after birth. [9]



Optimum Health

In order to attain optimum health, i.e. be healthy in a positive sense, the following conditions must be assured to promote health in a community.

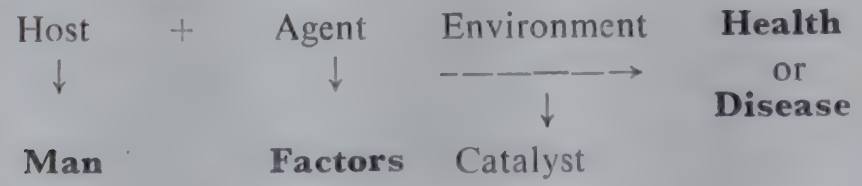
1. A Balanced Diet.
2. A Sanitary Environment.
3. Protected Water Supply.
4. Personal Hygiene.
5. Adequate Rest and Recreation.
6. Periodic Medical and Dental Examinations.

7. General Health Education including Family Life and Sex Education.
8. Mental Hygiene.
9. Marriage and Premarital Counselling.
10. Genetic Counselling.
11. Screening for Disease.

The list seems formidable, but these conditions, if implemented and practised will ensure optimum health and the need for costly curative medicine can be avoided.

Moreover, it will be conducive to the general development of the individual.

It is now a well recognised fact that a "Disease" is due to a multiplicity of factors - what we call the "Multiple Aetiology of Disease."



Pettenkofer of Munich (1819-1901) was an early proponent of this concept. However even when one unfavourable agent is present, it is the Environment that is the determining or catalytic factor, leading to disease or health.

These factors are summarised as follows.

1. **Biologic :** Bacteriae, Viruses, Rickettsiae, Fungi, Protozoa, metazoa.
2. **Nutrient :** Deficiency or excess of Proteins, Fats, Carbohydrates, Vitamins, Minerals and Water.
3. **Chemical :** Endogenous and Exogenous substances.
4. **Physical :** Heat, Cold, Humidity Noise, pressure, Radiation - all usually by excess or sudden changes.

5. **Mechanical** : Chronic friction and other Mechanical forces.

6. **Environmental**: Water (its lack or impurity) air (atmosphere pollution), Climate (Extremes or sudden changes in) Latitude. Longitude, Rainfall, soil (soil borne diseass), Inadequate housing, Inadequate disposal of refuse or waste. Rodents, animal, and insects acting as vectors for disease.

7. **Social** : Education, (its lack or inadequacy usually), occupational hazards, addictions (alcohol or drugs), unstable family life, smoking.

8. **Economic** : Income, (insufficient or irregular), debts.

9. **Psychological** : Anxiety, lack of job satisfaction, stress and strain, insecurity.

10. **Cultural** : Superstitions, dietary habits, customs and beliefs not conducive to health.

11. **Human Behaviour** : Inconsistent or aggressive.

12. **Genetic** : Inheritance of harmful genes or mutation of healthy genes due to radiation, chemicals or heat.

Nutrition

Nutrition is a dynamic process in which food is consumed and utilised for growth and repair of the body.

Growth implies increase in physical measures.

Development implies increase of intellectual and emotional faculties.

Adequate nutrition which is vital for attaining optimum health is ensured by providing every individual with a balanced diet. This diet contains proteins, fats, carbohydrates, minerals, vitamins and water in proportionate amounts to provide adequate energy for growth and repair of tissues.

Protein-Calorie Requirements

Proteins (derived from the Greek word "protos" meaning to come first), are complex organic nitrogenous substances containing carbon, hydrogen, oxygen, nitrogen and sulphur in varying amounts. Some proteins also contain phosphorus and iron, and occasionally other elements. Protein rich foods are milk, meat, fish and eggs from animal sources and pulses, nuts and beans from vegetable sources.

The recommended daily allowance for the Indian adult is one gram per kg. of body weight. This is increased in infancy, adolescence, pregnancy and lactation.[1]

TABLE

PROTEIN REQUIREMENT OF INDIAN CHILDREN

AGE (YEARS)	DAILY ALLOWANCE IN TERMS OF DIETARY PROTEIN	
	g./kg. body weight	Total (g)
BOTH SEXES:		
1	1.90	16.5
2	1.72	18.0
3	1.70	20.0
4— 6	1.66	22.0
7— 9	1.59	33.0
10—12	1.48	41.0
BOYS:		
13—15	1.44	55.0
16—19	1.33	60.0
GIRLS:		
13—15	1.40	50.0
16—19	1.27	50.0

Lack of protein and vitamin A can cause serious and permanent defects in children especially. These range from impaired mental development and blindness to death.

The reasons for lack of protein in the Indian diet are numerous :

1. Lack of knowledge of the importance of proteins.
2. Lack of utilisation of locally available proteins.
3. Dietary restrictions.
4. Superstitions and some traditionally harmful customs. (For example — In some rural areas pregnant women do not eat green leafy vegetables or drink milk).
5. Poverty.

"It was estimated that 10 — 15% of the people in the world, or roughly 20% of the people in the developing countries, did not meet their energy needs during the decade 1950 — 1960, (they were undernourished). The study was extended to estimate the incidence of protein deficiency as data became available ; this estimate was placed at between 25 and 33% (Sukhatme 1966).

What has since become clear is that protein deficiency is for the most part the indirect result of inadequate energy intake. In other words, what diets lack is energy foods to avoid the body katabolizing the protein people do eat. (Gopalan 1968). This finding is the opposite of what has been reported in various studies of the subject, notably the study on Protein Gap by the U.N. Committee on Application of Science and Technology to Development (U.N. 1968) which has formed the basis for international action.

The finding that protein deficiency is indirectly caused by low calorie intake is gradually being confirmed by a number of workers and is also reflected in the recent writings of F.A.O. (1971).

Current evidence shows that if a diet has 5% of its calories from good quality protein, such as in egg or milk, the individual's needs for protein will be met regardless of whether he is a pre-school child or an adult man, provided he eats enough to meet his energy needs.

Malnutrition

TABLE

Distribution of households surveyed in India (Maharashtra State) 1958 by calorie supplies per day per reference man, by National Sample Survey 862 households.[2]

CALORIES/per day/per reference man	%Frequency
Upto 1,300	6.8
1,300 — 1,700	9.7
1,700 — 2,100	14.7
2,100 — 2,500	16.3
2,500 — 2,900	16.6
2,900 — 3,300	12.9
3,300 — 3,700	9.0
3,700 — 4,100	5.5
4,100 — 4,500	3.5
4,500 and over	5.0
	100

"Since malnutrition (or the lack of a balanced diet) is the outcome of several factors — social, economic, cultural and psychological the problem can be solved only by taking action simultaneously at various levels — individual family, community, national and international levels.

Other measures to ensure people adequate nutrition are :

1) Increasing food production
2) Price control
3) Prevention of food adulteration
4) Fortification and enrichment of foods
5) Food additives
6) Inventing cheap supplementary foods (e. g. High Protein Foods)

7) Irradiated Food
8) Nutrition education, and
9) Population control

The Government of India is attempting to solve the problem of malnutrition by implementing the following programmes on a national scale : –

1) Applied Nutrition Programme
2) School, Mid-day Meal Programme
3) National Goitre Control Programme
4) Crash Programmes in Nutrition (For 0 - 3 years)
5) Vitamin A supplement to facilitate growth and prevent blindness,

Studies from the United States and the developing countries reveal the not surprising fact that as family size increases, per capita spending for food goes down. As a result, corresponding diet inadequacies and nutritional deficits are common. [3]

TABLE

Protein values of some foods

	Protein: percentage fresh weight	*Protein: percentage dry weight*	*NPU*
Plant foods			
Cassava	0.9	2.4	—
Potato	2.0	9.1	71
Maize (whole)	9.2	10.5	54
Rice (milled)	7.6	8.7	—
Wheat flour (white)	10.5	11.9	—
Apples	0.4	2.5	—
Spinach	2.3	29.1	—
Beans	22.1	25.0	—
Peas	23.8	26.7	—
Walnut	15.0	15.5	—
Animal foods			
Beef	18.5	48.7	76
Cheese, Cheddar	25.0	39.7	69
Chicken	20.2	59.4	—
Eggs	12.8	49.2	95
Fish	18.8	72.6	75
Milk	3.5	27.6	90
Pork	15.5	46.8	79

From : *Protein*, FAO, 1964. NPU *Net Protein Utilised.*

TABLE I

*Food Consumption Patterns by Studies of F. A. O.**

Major Parts of India

Rice, Millets and other Cereals	Moderately High
Pulses, Fats and Oils	Moderate
Milk	Low
Meat, Fish and Eggs	Very Low

India (Punjab) and Pakistan

Wheat, Rice	High
Milk and Pulses	Moderate
Meat, Fish and Eggs	Low

Cereals constitute upto 80% Calorie Supplies
and upto 70% Protein Supplies

Pulses constitute upto 10% Calorie Supplies
and upto 20% Protein Supplies

Food of Animal Origin constitute upto 4% Calorie Supplies
Meat, Fish and Milk — 10% Proteins

* Quoted in Asian Pop. Studies (No 11 1972 Publ. Bangkok)

Malnutrition, especially protein calorie malnutrition, is widespread and is to be feared not only because of its general debilitating effect but especially because of the irreversible brain damage that inadequate proteins cause. Data from 24 countries indicate that the prevalence of severe PCM (Protein Calorie Malnutrition) ranges from 0.5% to 8% and the prevalence of moderate PCM from 4% to 43%.[4]

"The human brain reaches 90% of its normal structural development in the first four years of life. We now know that during the critical period of growth, the brain is highly vulnerable to nutritional deficiences, deficiencies that can cause as much as 25% impairment of normal mental ability. Even a deterioration of 10% in the diet is sufficient to cause a serious

handicap to productive life. This s irreversible brain damage. What is particularly tragic in all of this is, that when such mentally deprived children reach adulthood, they are likely to repeat the whole depressing sequence in their own families. They perpetuate mental deficiency, not through genetic inheritance, but simply because as parents they are ill-equipped mentally to understand and hence to avoid the very nutritional deprivation in their own children that they themselves suffered.

In low income countries the high mortality rates among children in large families and in families with close birth intervals, are in part due to malnutrition. The greater the sibling number, the greater the likelihood of malnutrition among poor families. Studies of pre-school children in Colombia, for example show that 52% of the children in families in which there were five or more pre-school children were seriously malnourished, whereas only 34% of children in families with only one pre-school child were malnourished.

In Thailand, of the children whose next youngest sibling was born within 24 months 70% were malnourished; of those in families without a younger sibling, only 37%.

Height and weight being affected directly by nutrition showed variation in children according to family size. Even in high income countries the children of the poorer families are larger at any given age when the number of children in the family is small. For example, of 2,169 London day-school students, 11.25 years old, children from one child families were about 3% taller and 17 - 18% heavier than children from families with five or more childern.

The difference in physical growth between children of small and large families in Great Britain seems to affect mainly the poorer social classes. In the higher income classes boys in families with 3 or more children are taller at all ages than boys in small families; the reverse is true for girls. In the upper and lower manual working classes children in small families average 3 – 4% taller than those in large families at 7 and 11 years of ages and 1.4 to 2.8% taller at 15 years.

Diet surveys carried out in India have shown that the average Indian diet is ill-balanced with an excess of Carbohydrates and very little protective foods like milk, meat, fish, eggs, fruit and leafy vegetables.

The Nutrition Advisory Committee has designed a diet from the resources available required to give a total caloric value of 2,400.

Such a diet would cost, (in 1960) Rs. 35 per month per adult. Only 20% of our people in India can afford this.[6]

TABLE

SUGGESTED DAILY DIET FOR AN AVERAGE INDIAN STUDENT (ADULT)

No.		VEGETARIAN		NON-VEGETARIAN	
		Grams	Calories	Grams	Calories
1.	Cereals	400	1360	400	1360
2.	Pulses	70	245	55	192
3.	Green Leafy Veg.	100	27	100	27
4.	Other Vegetables (Cauliflower)	75	22	75	22
5.	Roots & Tubers (Potato)	75	73	75	73
6.	Fruits (Banana)	30	30	30	30
7.	Milk (Buffalo)	200	234	100	117
8.	Fats & Oils	35	315	40	360
9.	Meat (Mutton)	—	—	30	58
10.	Egg	—	—	30	51
11.	Sugar & Jaggery	30	120	30	120
12.	Ground Nuts	10	56	10	56
	Total		2482		2466

Indian rural economy is not balanced, for while rural earnings give only Rs. 16 per individual per month, the same individual spends Rs. 21 in that month.

Only 71 crores of the total outlay of 351 crores of rupees is provided for rural hospitals and health care in our 4th Five Year Plan. The top priorities of the health tasks are not always properly chosen.

The Green Revolution in India has lulled many into a state of complacency. While it is true that great progress has been made in increasing food production, the increasing population has almost nullified this increase, so that the per capita availability of food is only 446 gms. (cereals and pulses) per day and a per capita availability of 121 ml. of milk per day.

Yet India has the largest cattle population in the world — most of the cattle being of poor quality, yielding little milk and serving no useful purpose, yet consuming much fodder. The economic advantage would be considerable if these animals were permitted to be slaughtered and much needed meat be made available for consumption and more leather for foreign trade. About 1/3 of the people have no objection to eating beef.[7]

Where the proportion of staple cereals and starchy roots in the North American diet is estimated to be only 25%, and in the British diet only 31%, in Latin America it is 54%, in Africa 66%, in the Near East 71% and in the Far East over 73%. Conversely, while the proportion of animal products — milk, meat, eggs and fish — in the typical North American diet reaches the exceptionally high figure of 40% and in the British diet can be as high as 27%, the figure for Europe as a whole is estimated as 21%, for Latin America 17%, for Africa 11%, for the Near East 9% and for the Far East 5%.

In only a few regions of the world are there adequate food supplies. These are the United States and Canada, Australia, New Zealand. Western Europe, parts of Argentina and parts of South East Asia. These regions have already utilized the means of increasing agricultural productivity, but only ten countries in the world today produce more food than they consume.[8]

"The "*dhals*" which have a *high protein content* (vegetarian meat !) take the place of animal foods in communities where it is consumed (though in insufficient amounts). However, the body utilises only 40-60% of the vegetable protein which forms the chief kind of protein (in contrast to animal protein) that is

consumed. Certain essential amino acids like Lysine and Methionine are also present in insufficient amounts in this diet of pulses.

According to a National Survey the average daily intake of calories in India was 1890 calories with a daily protein intake of 53 grams.

Pregnant women, nursing mothers and growing children, ie. a group, constituting 60% of the population, lack adequate calories, proteins, vitamins and mineral. The result of this is seen in the high incidence of low birth weight babies, still births and fairly high morbidity and mortality rates in children.

Health education for adequate nutrition and balanced diet needs to be given to all parents, teachers and health personnel. Many foods are freely available at reasonable prices and can be used to supplement the diet. These (greens and fruits especially) are often locally available or easily grown in the kitchen gardens, and found both in cities or in rural areas.

The C. F. T. R. I.* has also developed multi-purpose food—which is a blended flour of groundnuts and Bengal gram. It is cheap, extremely nutritious and can be used in a variety of ways. **For children especially, C. F. T. I. has a prepared mixture of wheat, groundnuts, and soya bean or Bengal gram flour with skimmed milk powder.**

More recently, using a machine, C. F. T. R. I. has extracted protein from leaves and grass. This process is still in the research stage,

It is interesting to note the view of Dr. P. V. Sukhatme—"An insufficient amount of protein in the diet is held to be at the heart of the problem of persistent and widespread malnutrition in the developing countries. However, when one examines the available data, the conclusion is clear that what diets lack is not protein but energy foods to enable the body to

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* Central Food Technological Research Institute (Mysore) India.

utilize the protein people actually do eat. There s no evidence that the quality and concentration of protein in cereal-legume diets normally eaten in the developing countries is inadequate to meet protein needs, provided energy intake is adequate. The protein problem is therefore essentially a socio-economic problem. Production of semi-conventional, cheap, protein-rich foods using modern technology and distribution of factory foods so produced through special feeding programmes as recommended by the international bodies, will be a costly and inefficient method of solving the problem".

Much can be continued to be said on the subject of nutrition, but at the present time given the familiar family situation of providing adequate nutrition two things must be emphasised :

1. The use of locally available foods like green leafy vegetables in the diet.
2. Early recognition of nutritional deficiencies and their remedy by sound dietary practices and use of food supplements prepared by C. F. T. R. I.

A recent report[10] says "Nearly one million Indian toddlers die every year because they do not get enough to eat. Although these hapless toddlers constitute 16.5% of the population, they account for 40% of the total deaths. One-fifth of the babies born in India never live beyond the age of five years."

In a paper on Nutrition and Development, Gopalan points out that apart from the one million small children who annually fall victim to malnutrition, many more die of diseases they would have either escaped or survived if they had been better nourished. The children would stand a better chance if they were more sensibly fed from even the available foodstuffs.

In a countrywide survey, the severely undernourished pre-school children (17 — 18% of the number surveyed) were 40% lighter in weight than they should be for their age. About 14% were 10 — 23% lighter than normal

and 65% were 26 — 40% lighter than they should be. Only 3% were the right weight for their age.

The question of wants also means that the use of resources may go far beyond what someone from another social background might consider quite adequate for survival or even for a good life. It has been calculated, for instance, that a child born in the United States is likely to consume in the course of a lifetime, 28 times as much as a child in India.

TABLE

Estimated consumption per head in 1960 in various countries (U.K. = 100)."

U.S.A.	140
Sweden	125
West Germany	86
Mexico	22
Taiwan	12
Ceylon	9
India	5

Food Production

Since nutrition is closely bound up with Agriculture, it is imperative that the problem of malnutrition which is so serious in India be confronted at "grass-roots" level. Three possible avenues are open ;

1. The growing of food crops to be encouraged, expanded and given positive incentives.
2. The storage, distribution and allotment of food to priority groups (e.g. the vulnerable population) given due attention.
3. Increased research and exploration of food from the sea and use the protein containing vegetable foods like groundnuts and soya bean.

The exact fishing potential of the ocean remains unknown. Indeed fish farming as a serious industry is still in its infancy in most parts of the world. The Northern Hemisphere is 61% water and provides 98% of the world's fish supplies. The Southern Hemisphere is 81% water but it

supplies only 2% of the fisheries of the world. It could yield far more food — and of a particularly valuable type — being of good protein content.[12]

It is of importance and interest to look to future trends in food cultivation for both the rich and the poor countries.

The rich countries, with no greater rate of growth in food production but most of it coming from increases in productivity and with only half the rate of growth in population compared to the developing countries, improved their per caput availability of food and were able to export increasing quantities.

As a consequence, trends in the food supplies of the developing countries have been somewhat more favourable than those in production but this has taken place at the expense of the trading pattern between the two groups of countries. The Far East and Near East, which were exporters of food before the War, are now importing 6 and 7% respectively of their supplies. Africa and Latin America are still exporting but on a much reduced scale. This unfavourable development has tended to increase balance of payment problems and to accentuate the difficulties resulting from the almost continuous decline since the Korean boom, in world prices of primary commodities. The situation is illustrated by the example of cereals ; the less developed countries (excluding Mainland China) which exported ten million tons of cereals before the War are now actually importing nearly 20 million tons, and this largely to maintain their current unsatisfactory level of diet. Judged by these trends, the prospects of stepping up the rates of growth to 3% in total foods and 3.5% in animal foods over the years 1965 – 2000 seem bleak indeed.

Since we cannot take comfort from the past trends, we should find out what are the possible sources of food supply, what resources we have and now we can exploit them to meet our future food needs. Never before the planning of resource use and land use in particular has assumed so much importance as at present under the heavy pressure of demographic growth.

POPULATION AND FOOD

" The most widely shared concern about the present growth of world population is the fear that it will outrun the growth of food supplies and bring the world, or at least the more unfortunate of the under-developed countries, closer to starvation."

Goran Ohlin

It was Malthus, an English parson born in 1766 and known for his essay on the "Principles of Population" who sounded the first warning between growing populations and food production.

With an estimated population of 5 million in England in 1700 and the First Census of 1801 giving a figure of 9.2 million, there was a relative worsening of the nutritional situation for which the enclosure of the land for pasture (instead of for crops) was chiefly responsible.

Malthus began by pointing out the disparity between the possible growth of the population on the one hand

and the means of subsistence on the other : the population may grow by geometrical progression whereas the means of subsistence can grow only by arithmetical progression. [1]

However, as Don Arthur says,[2] "The inadequacy of food and natural resources has not proved to be limiting in the determination of the size of either populations or of families. Indeed, the reverse appears to be often true. In such countries as India, near famine conditions do not control numbers and frequently it is the unskilled and the underfed who have the largest families.

On a world scale, the inadequacy of food is not related to its decreasing production, for although it was reduced much more than population during the II World War, production per head had overtaken pre-war rates by 1952/53.

From 1950 to 1968 world cereal production was increased by 70%.

Subsequently, world production of food has increased by 3% while the average population has increased by 1.7%.

And, Gunning[3] argues that —

"To many the doubling of world population as predicted for the year 2000, will seem an unsurvivable disaster. Some experts, however, see it as one necessary condition for the development of world economics because, in their view, a similar demographic explosion will be the only sufficiently strong incentive to force humanity into action. We have seen the draining of the Dutch Zuiderzee as the result of a strong demographic pressure. One can look at a great desert like the Sahara, a huge economic barrier for the development of Africa. No attempt at cultivating this desert will be made as long as the present "lack of world population" continues.

In Khartoum I was told by a Government Official that his ministry has ready plans for the irrigation of the whole Sudan, for which only 10% of the Nile water appeared to

be needed. (Part of these plans I have actually seen realised!) There were only two great obstacles. One, lack of money, could certainly be overcome, but the second, lack of population seemed hopeless because in order to cultivate the soil made available by the plan, a population of 150 million would be the minimum required. The Sudan has no more than 15 million inhabitants."

With a stagnant and intermittently diminishing population for many decades, India in 1921. was unspeakably poor compared to India in 1961. For quite 40 years before 1921, India's population did not grow at all. If anything, it was decimated by pestilence, and even more by recurrent famines. But between 1921 and 1961, the annual rate of growth of India's population accelerated to 2.3% per year. In 1959, India was even richer than she was in 1961, despite a still higher annual growth of around 2.5%. A small population alone is no guarantee of prosperity. On the other hand, history has proved that a rapidly increasing population at certain crucial stages - either by migration or natural increase, has been a pre-condition of prosperity. We do not have to travel beyond India for proof. Ample proof is available in Assam, Rajasthan, Haryana, Maland and Dandakaranya.

A steady rate of economic and cultural growth is more vital for a nation's prosperity than a small or diminishing rate of population growth. The ideal is reached when the two trend lines begin to diverge away from each other, particularly when the economic growth line continues to show a comfortably steady upward trend, while the population growth line shows first a steeply descending followed by an almost level trend.

George Hanar, 65 stated, "I personally haven't the remotest doubt that if we could mobilize our technology, our man-power, our efforts, provide the back-up and accelerators that are necessary, we can gradually "invade" the tropics, convert the better agricultural areas initially to usefulness in the production of plant materials or the production of animal materials. It would be no problem, in my judgement, to double or triple world food supplies in terms of the potentials which

exist. **The problem is not in terms of potential. People just haven't really been able to bring together the consortium of effort which is necessary."**

About agriculture, Colin Clark says, "We must bear in mind two very different concepts, namely the amount of land per head required by a farming community to keep itself fed, and the quite different concept of the amount of land required to keep itself fully occupied. These are based on the two very different concepts of subsistence forming and commercial farming." Neither of these terms is precise or absolute. Clark has classified the cultivable land in several categories according to climatological factors (temperature and rainfall)

One square kilometre in Europe (moderate temperature, sufficient rainfall—one crop a year) is called one unit of "standard land."

Expressed in units of "standard land," the potentially cultivable surface of the world is 76.8 million km,^{2} according to the most narrow estimate, and 107 km^2 according to a more optimistic calculation.

The cultivable surface of the world can feed and clothe, according to European standards 34.57 billion people (narrow estimate) or 47 billion (more optimistic estimate). According to Japanese standards where the subsistence unit per person per year is much lower, these figures are 110 billion and 157 billion.

Fritz Baade (Director of the Institute for World Economics, Kiel Germany) reports that 11% of the world's surface that is now used for agriculture could produce more than 10 times the present output with the help of modern techniques and feed 40 billion people.

Land Resources in India

The area which an average Indian has is 2.25 acres of land (per capita basis), as compared to 13.45 acres available to the world citizen. Moreover, the per capita arable

land for an average Indian is only 0.6 acres. It is estimated that an individual requires 1.8 acres of arable land as the minimum for serving his food needs.[6]

Charles Kellog, an American authority on soil problems, has demonstrated that if we brought into use only 10% of the unused area in the tropical zone we would add over one billion acres, or 40% of the total to the world's cultivable land.

Land for grazing, economically productive forestry and for grass cropping could be developed without much expense.

Food Production in INDIA

India has an area of 1,262.275 square miles or 808 m. acres and an average density of 370 people per square mile.

TABLE

Total geographical area in 1,000 acres	807,856	
Net area, according to village returns	720,970	
Forests	126,099	
Net area irrigated	55,682	
Net area sown	322,460	cultivated
Fallow Lands	58.490	
Not available for cultivation	116,201	
Other uncultivated land (Including permanent pasture, grazing)	97,720	uncultivated

That is. about 40% land is cultivated of which I/7 is irrigated. Hence, the demands on these lands for crops is very great.[8] Several ways may be adopted for *Improving the quantity and quality of food.*

I Increasing the land under cultivation.

It is important that land should be brought under cultivation, and that wherever possible the farmer has a land holding that is productive enough to meet his own needs first, and then gain him profit which is put back into purchasing hybrid seeds. and amenities to improve the farm's yields.

Agricultural land should be safeguarded by law.

Moreover, reclamation of land from marshes or swamps, and deserts undertaken.

The cultivation of sorghun, a cereal rich in lysine, and needing minimal water, should be encouraged in drier areas

McCormack[4] says, "It is true that large-scale reclamation often involves large investment, and it may well be judged that it is more economic to use other methods of food production. But the fact that opportunities exist for extending the area of cultivation should offset a certain amount of pessimism, especially as concerns the longer term."

In a speech to scientists from all over Europe in 1968, Pope Paul VI said, "It is perhaps unnecessary to point out that the most terrible calamities, capable of destroying all the inhabited earth, come from precisely the best equipped laboratories of modern physical science. May you have the courage to renounce these things. Rather make the earth fertile, make it produce bread for all; fight against the sterility of desert zones, intensify farm production everywhere, make possible victory your art, your mission and your glory."

In the same vein N. M. Zhavoronkov summed up the view of technological optimists with the words that "as long as the sun shone and people were capable of creative thinking, they had no need to fear the future."

It is still disputed whether there is a possibility of cultivating the vast areas of humid tropical forest around the equator in these continents. If more research were undertaken into the problems of tropical agriculture, however, it would seem that tropical food crops (on which little research has so far been expended) could at least approach the success of cash crops such as cocoa and sugar and other tropical products on which a great deal of research has been done, so that crop-yields have been greatly increased.

Because of the inter-dependence that exists among food needs, food demands, overall income, agricultural

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product, total output Gross National Product (G.N.P.) or Gross Domestic Product (G.D.P.) it is meaningless to consider a nation's demand and supply of foodstuffs independently from overall economic progress.[10]

Perhaps now that men have landed on the moon, by investing billions of dollars and using a huge reservoir of scientific brainpower, it would not seem too extravagant to turn to the development of some of the earth's possiblities for feeding its people; the relative cost would be very much less.

Small holdings are not productive enough and more and more farmers are forced to become labourers on other holdings or become landless.

In "India and Pakistan cultivation is carried on mainly by means of ox-ploughs. It is possible to make reasonable estimates of the amount of land required to keep the plough team fully occupied during the cultivating season, but not to over-strain its capacity. A method devised in 1945 by Tarlok Singh can still be regarded as satisfactory. For most regions of India this gave a result of 3—5 hectares per adult man as the amount of land required for full employment during the cultivating season.

It is indeed the shortness of the monsoon which makes draught animals necessary in India and Pakistan, even when farmers are so poor that they have great difficulty in feeding them. Where rainfall is more abundant in India, hand cultivation may be preferable, particularly for some of the higher value crops such as jute and pepper and the amount of land required to keep a man fully occupied is lower.

In Japan where hand cultivation still prevails (though supplemented by abundant use of fertilisers, insecticides etc.) careful planing and diversification of crops make possible the full employment of 2.8 man equivalents of labour on a farm of only 1.9 hectares."[12]

II Irrigation

The rice production, even though inadequate, needs much water and though the new strains of rice do not need more water they benefit from more water.

Nearly seventyfive percent of Indian farming is dry farming.

Therefore irrigation projects and methods to utilise water of rivers, lakes, tanks and wells should take high priority.

Gunning asserts that the actual irrigated surface (13% of the total agricultural surface of the world) produces 25% of the total food output. Even so at least 3/5 of this surface is not irrigated in the best possible way.

Expanding the *irrigated land* even on a world-wide basis is important. It is estimated that *not yet 5% of* the world's river water is used for irrigation. By sprinkling instead of flooding almost twice the surface can be irrigated. Moreover, the newly cultivated land does not have to be flattened and less salt loss results.

Ancient gravity methods are used to draw water requiring animal or manpower and thus increasing the economic burden on the farmer.

However, increased irrigation also brings problems of malaria and schistosomiasis by providing the vector or carriers of these diseases with suitable conditions for breeding and development and this must be kept in mind. The provision of pump sets to farmers is also of prime importance.

III Regeneration of the land by the use of Fertilisers

Multiple cropping and lack of appreciation of the "rape of the land" has made imperative that fertilisers be provided and used increasingly in India.

Incomplete nitrogen cycle due to non-return of faecal products as sanitary facilites increase and sewage is disposed of and therefore lost to the land, make it necessary to let the land lie fallow for one or two years before a new crop can be produced. Soil erosion is a matter for serious concern as land can be lost for cultivation.

McCormack says, "It seems reasonable to assume that through research, ways can be found to make the in fertile but otherwise favourable tropical soils acceptably productive. It was through research that the infertile sandy soils of Florida and, for that matter, many soils in the South Eastern United States, were made productive. Fifty years ago they were as low in fertility as many of the soils of the humid tropics.

The Belgians, for example, before suspending their research in the Congo, had developed an oil palm which when properly grown yielded about 4,000 kilograms of palm kernels per hectare whereas the ordinary palm yielded approximately 500 kgs. per hectare.[13]"

Fertilizer

Of the actual irrigated surface, three quarters receives an insufficient amount of fertilizer, i.e. an average of 2 kg. nitrogen per hectare per year instead of an "optimum" average of 50 kg. per hectare. Experiments of the FAO in Ghana gave a tripling of the output per hectare when sufficient fertilizer was used: 1070 kg per hectare without, 3486 kg. rice using 40 kg. nitrogen, potassium and phosphorus per hectare, giving an increase of net income from $47 per acre to $ 172 per acre. To give a few figures for comparison:

India in 1950 had an average fertilizer consumption of 0.5 kg. per hectare and an average cereal production of 0.65 ton per hectare. In 1960 these figures were 2.5 kg, fertilizer per hectare and 0.83 tons of cereal per hectare, i.e., an increase of 180 kg. cereal per hectare.

Japan increased her average fertilizer consumption between 1950 and 1960 from 153 kg. per hectare to 304 kg. per hectare. Her cereal yield went up from 2.9 tons per hectare to 4,1 tons per hectare, i.e, an increase of 1200 kg, per hectare.

Holland in 1960 used an average of 456 kg. fertilizer per hectare.[14]

Dr Pauley of the FAO has estimated that in

i) the years immediately ahead India and Pakistan would need to increase their consumption of fertilizer at the fantastic rate of 33% per year.

Also improved strains of rice and wheat now increasingly used in India, respond more to heavier doses of fertilizers than ordinary strains.

Indian yields for crops other than wheat are quite low by international standards

"It has been argued that with better varieties, pest control and application of fertiliser on the Japanese scale, Indian rice yields could be raised to almost 2½ times their present levels"[15]

Domestic Production as a percentage of the total supply of food in selected countries[16]

Country	*Wheat & Rye*	*Rice*	*Potatoes*	*Sugar*	*Meat*
Australia	536%	319	102	353	145
India	56	97	100	106	100
U.K.	46	—	95	37	65

Inspite of massive investments since 1950 in urban and industrial sectors and in spite of the massive absolute increase in the urban and industrial population which has broken away from agriculture, the proportions of populations dependent on agriculture, has stood almost constant, around 70%, significantly, inspite of the rising share of industries in the Gross Domestic Product, the percentage share of agriculture in the G.D.P. in India has also stood fairly constant, around 47%."

iv) Food Supplies From The Sea-Inland Water

Land is limited in supply. The largest section of the population live in countries in which the scope for the extension of arable land is extremely small. At the same time, practically the entire supplies of food are, raised from lands, either directly or indirectly.

For the world as a whole, 87% of the total supplies of calories and 70% of total proteins are derived from "arable lands" If we include foods of animal origin excluding fish, we find that the world draws 91% of calories and 91% of proteins from lands in general. With fish as a food acceptable to large sections of the population, and its vast coastline, it is surprising that fish farming has not been undertaken more extensively in India.

The foods of sea and inland water origin consist mainly of fish; seaweeds and other plants growing in water are eaten in negligible quantities.

Fishery makes very little claim on lands and marine fishery none at all. Of the total catch of 53.3 million tons estimated for 1965, 7.6. millions were from fresh waters. Though relatively a less important source for the world as a whole, fresh water fish contribute a third of the total catch in the Far East. In this region, which is, as we have seen, so poorly endowed with land resources to feed adequately its large population, the development of inland fisheries is of particular importance. The region has large water surfaces. There are, it is roughly estimated, 37 million hectares of cultivable inland waters in the Indo-Pacific region.

By far the larger supply of fish, as said before, comes from the seas and oceans, and the total catch from this source has been increased at 7% a year. In spite of their larger population and vast accessibility to the seas, the present annual catch of marine fish of the developing countries together is a fifth less than that of the developed regions. In fact the latter draw practically their entire supply of fish from marine sources. In the Far East, Japan alone lands 6.6 million tons a year while the rest of the region only 9.3 million tons. More remarkable however is the achievement of Peru; annual catch has been expanding by 40% a year. This fantastic growth, which has put Peru in the lead among fishing nations of the world, is largely due to the growing demand for fish meal in North America. Other developing countries may not find such favourable conditions. On

the contrary, they would confront considerable difficulties, largely because of their technological backwardness.

Though there are still large unexploited areas and numerous unexploited stocks of fish, it is equally true that certain areas are over fished and some stock of fish greatly depleted. Also there are large unfertile areas in the oceans. We have not yet learned to farm the sea. It is therefore necessary to be on guard against depletion of stocks.

All that fishery biologists could in the present state of knowledge predict is that the production of fish, crustaceans and molluscs can probably be doubled without damaging present known resources (Finn, 1960). This will give us 100 million tons.

Though marginal in terms of calories and total protein, it is substantial in terms of animal protein, accounting for 13% of the per caput intake of animal protein for the world as a whole, about a fifth for the developing region and as much as a quarter for the Far East. Even to maintain these levels by increasing the supplies of fish to match with population increase will be a commendable task.

A number of species not eaten directly are processed into fish meal and used as feeds and, as such, indirectly contribute to animal protein foods. Fish meal is a growing industry. A third of the total catch is used for animal feed

Another promising line of exploiting marine resources has been opened by the newly developed fish protein concentrate. Quite a wide range of fish, which are not eaten, can be turned into high quality protein for direct consumption.

V "New" Foods

The "new" food which are emerging out of scientific research and exploration and produced on industrial basis can broadly be classified into two groups :—

1) semi-conventional foods
2) unconventional foods

The first group comprises foods derived from familiar sources but the source materials though rich in nutrients were unsuitable for direct consumption. These have been largely fed to livestock. Biochemical engineering is fast developing to extract nutrients, mainly protein, from these materials or convert them into products of high nutritional value and free from harmful substances so that they fully meet the standards for human food. (including vegetable protein flours.) These products make available much larger quantities of protein than the conversion of the source materials into animal feeds would.

The second group, i.e., unconventional foods comprises foods which could be produced from completely new sources. These have been found principally by two methods, chemical synthesis or mass culture of micro.organisms. However, very few of these new foods have been well established yet for industrial exploitation

Perhaps the greatest achievement to date in this field has been the synthesis of vitamins. Apart from their therapeutical value, synthetic vitamins are needed as a dietary supplement. A particular feature of vitamins is that human body requires a large variety of them but they are quite effective in minute quantity. To provide an adequate combination of all these vitamins common diet has to be varied and expensive and would in the end increase our requirement of arable land. This comparative cost advantage is not shared by the synthetic substitutes of other constituents of diet. For example, grains, sugar and starchy roots would provide carbohydrates more economically than any synthetic substitutes. Synthesized fat would not be economical either, nor a mixture of synthesized essential amino acids.[17]

The produce of many hundreds of millions of hectares are destroyed by pests (insects, birds, monkeys and rodents). The use of pesticides is necessary on a carefully supervised but wider scale.

The provision of tractors, pump sets for the small farmer and incentives to him in the form of hybrid seeds, fertilizers and cash loans is needed.

The improvement of farm management by extension education, the provision of co-operatives to market the produce and land and tenancy regulations reform can surely help in the long run to prove wrong that "hunger is not an occasional visitor but a constant companion for half of mankind".

The eventual solution of food and population balance is dependent upon success in convincing millions of citizens in the developing nations to take individual action for the problem of food production and is but one part, albeit a very important part of the enormous problem of economic development in the poor nations.

PART III

POPULATION & EDUCATION

EDUCATION

"To forge character is the target of education".

Character Education

Teaching is the imparting of knowledge and should not be equated with education which has a much wider scope and has as its goal – the development of a mature personality in the individual – thus "educated"

"Education consists essentially in preparing man for what he must be and for what he must do here on earth, in order to attain the sublime end for which he was created - and further, that an integral concept of education is an all round or comprehensive formation of the person in full accord with the absolute requirements of his sacred destiny and with the characteristics of contemporary society."[1]

Character is in part something we have, and in part something we are. There is a great difference between having and being. We may put it this way : "having goes with

quantity — you can have more and more. But "being" goes with quality."

In education we need both. We need some solid knowledge we can have but we need also the character we can be. In the schools today the situation is too much in the way of 'having' and too little in the way of 'being'. We concentrate on knowledge and miss the most important character.

Character is in part something which remains itself. And in part something which goes all out to new things.

It is like a tree ; a tree has deep roots in the earth, and it has something which grows and expands in the air. The deep roots in tradition give you a deep quietness and can be something so wonderfully creative. And the branches are constantly reaching out to new life - expanding, growing and actively living.

Youth have a tendency for all that is new, all that is on the move, and the question is how to find the balance between tradition and evolution.

Character is something which is common to everybody, but is also different for everybody. Character is not something finished, we are all on the way to what we are meant to be, on the way to our destiny and everybody has a unique destiny. Everybody has a hidden treasure in himself and the adventure of life is to dig out bit by bit this hidden treasure

It is held by historians that 20% of people in every nation are initiators and 80% are imitators. Education should make you an initiator.

Education is to find in everybody, in every pupil, every person we have to deal with, what his special gift is, what he is meant to be. Education has the tendency to put everyone on the same level because it is more comfortable for the teacher to have everyone on the same level and not to be obliged to care for the differences, and for the unique thing each individual can do or be. It needs a lot of patience, a lot of passion and a lot of understanding to do that. If you put labels on people it prevents

them from finding their own reality. And we have to be very careful with our words and to find out the exact word which will challenge the individual to go on the way to himself and how with his gifts he can best serve the world.

Education focused on the development of a new and broader outlook on life need not wait for the spread of literacy; it can be applied effectively by the spoken word and with the aids of modern mass communications, penetrate and reach the remotest areas of India.

An educated person should benefit all those who come in contact with him, and raise to his level those not so fortunate to be educated; and also to benefit from those who are educationally superior to him and so improve himself.

Moral Education has directly and immediately nothing to do with socialisation or with a particular set of norms, but basically it is to be located in the field of acting for reasons, making choices on acting with intention and purpose. Therefore in trying to devise a programme of moral education, we have to direct our attention towards getting children to be able to act intentionally, to act for reasons, to appreciate moral reasons and to act for them in freedom.

The main line of influence in Freudian theory on moral education seems to be that Freud does not recognize the importance of the unconscious super ego, the unconcious conscience, the way in which parental norms, parental rules are interiorized into a system of inner controls. Nevertheless, he also envisaged that moral development towards maturity involves movement away from that towards the sphere of the ego, the rationally self-directed life.

American researchers (Pack, Haifghurst and Taba) regard the ideal towards which we should develop as the moral type they label, the "rational conscientious".

The notion is that morality ought to grow towards being reasonable, acting for reasons, having intention; this kind of activity ought to be the sort of thing moral education should be promoting.

There has been much criticism of the "indoctrination" that students complain they have undergone. Of this Nicols says there are interpretations of the notion of indoctrination which do not exclude authoritative teaching or the teaching of rules altogether and yet not closing the child's mind.

He upholds that revival of interest in the education of the emotions and attitudes for this is in a way complementary to the extremely abstract and intellectual character.

About the School and Moral Education, he says-the school is a community and that the quality of the community is the most important morally educative factor. Community is a network of relationships and it is on the dominant quality of those that its quality of educative value really depends. Subjects like literature might promote the ability to understand one's own feelings and to enter sympathetically into the feelings of others; physical education might promote a right attitude to the body; history might teach an awareness of cause and consequence in human events and therefore the ability to assess probable consequences of our actions. These are all abilities without which intentional moral decisions cannot be made.

He further advocates the direct moral education through the religious education lesson. In a constantly changing and a very complex and a very self-aware kind of world, people have to walk further down this road for themselves. They need these moral abilities to think and feel their way through moral questions, they need a degree of moral autonomy which at one time was not necessary or perhaps was not possible.[3]

It is noteworthy that even in the literature of today for all its rejection of God, the yearning for the new man continues to find expression.

Edmund Fuller, in his "Man in Modern Fiction" points out that there are three basic images of man reflected in modern literature: the theistic, the atheistic and the God-residue. All three seek a new humanism. The theist wants the new man to be as he himself intends. Both see him fulfilling his destiny in

the service of his fellow men; the thirst for the love of God and the hope of a heavenly paradise- the atheist for the love of Chairman Mao and his likes and the hope of an earthly paradise. The third group, the God-residue writers, fall into a contradiction. While they protest the illusoriness of religion, of good and evil, they nonetheless exhort their fellows to work for posterity, to educate, revolutionize, liquidate, live and die for the good of the human race.

What all three have in common is a code of conduct and a goal that can reform the old man into the new.

If further development calls for the work of more and more technicians, even more necessary is the deep thought and reflection of wise men in search of a new humanism which will enable modern man to find himself anew by embracing the higher values of love and friendship, of prayer and contemplation.

One of the roles of all education is precisely to form a man in whom these two dimensions - vertical representing man's gradual opening up of himself to always higher values and perspectives : and horizontal dimensions signifying man's gradual opening up of himself to others - remain always open and in mutual harmony always dynamically tending towards that "omega point" of greatest opening to God and to man.

Scientific and technological progress is meaningful only in so far as it is put at the service of man, of the whole man and of all men.

The purpose of education is to lead man to become more responsible, more free and increasingly capable of changing his milieu. To tear him from his milieu is what I call an alienating education

Education has always been keenly sought in developing countries. Individuals rightly see schooling as a means

of personal advancement. For a nation the same applies, but the wakening of one may conflict with the ambitions of the other. Parents particularly associate education with the fruits of independence, the means of acquiring the position and wealth of the white bwana class. Unfortunately this attitude still prevails in many developing countries ; and where the pattern of education remains basically unchanged, it is largely irrelevant to the needs of the country.

In Tanzania, an agricultural country, the educational system is tailored to the country's economic needs-"we teach them in the context of our major economic preoccupations-school life has to reflect the life of rural Tanzania."

They have an adult literacy campaign. Working people have been spending an hour a day during working hours, doing what the Minister calls a " work-orientated literacy programme" which integrates learning with job skills.

The leaders of developing nations have to strike a balance between the need to produce essential manpower on the one hand and to extend the basic human right of education, through a probably much sparser schooling to all.

The Educational System

Education should encourage self-reliance in a country where it is essential for a great percentage of the population to be self reliant.

The new man is one in search of values and interpersonal relations. How can values be transmitted without interpersonal relations ? In other words, where does one find the essential factor of interpersonal relations in mass media ?

Television is no substitute for human relations, nor does it have answers for the basic pedagogical question of the relation of person to person.[4]

The Dependence of the Educational System in Respect to the Political System

When the inequality with which educational benefits are distributed principally in the developing countries, is analysed, the analysis, is frequently limited to the immediate causes : the scarcity of financial resources, the difficulties of transportation and communication, the poverty of the population etc., *Rarely is one made aware that the educational system is a product of conscious and deliberate political decisions ;* its elitist people, the markedly unequal distribution of educational opportunities among regions or among social classes is not a result of chance but of the relations of power which are determining a particular educational policy.

The operation of the political system is usually explained in terms of an input-conversion-output model. The "inputs" are the supports and demands which the various social sectors and interest groups present to the organs of political decision, which " convert " these supports and demands into political decisions which are the " product " of the system.

The inequalities of education are generated at the political level, by means of an interplay of pressures and interests. The decisions concerning educational policy, as the rest of the governmental decisions, tend to reflect the relations of power existing in society, with more fidelity where there is less social and political articulation of the weaker classes and groups.

Therefore, it is utopian to think that through the magic of a beautiful equalitarian ideal the decisions of the State will produce educational equality ; education is, at this first level of analysis, a function dependent upon the configuration of power in society, and educational policies tend to reflect imbalances in the distribution of power.

Taking Mexico as an example Latapi says —" As for educational policy, the economic interests see in the school system an instrument for the training of the labour force. As a consequence it is the profile of existing employment which is the criterion which guides the development of the educational

system. This will have as its principal function, the sorting out of the individuals who will find well-paying jobs from the many whom it is necessary to divert to unskilled employment, under employment or to no employment at all. In this way the economic inequalities, intrinsic in an economic strategy and production mode, determine the educational inequalities.

Given the social structure characteristic of underdevelopment it is therefore unrealistic to expect that in the near future the ideal of " educational equality " implicit in the gratuity of public education, will promote economic and social equality. For brevity's sake, I omit to mention numerous studies which have shown the determining character of the individual's socioeconomic origin in his success in school. The gratuity of education is incapable of counterbalancing in a significant way the original economic inequalities, and the independent effect of education on social mobility tends to be very limited and confined to certain strata of the middle class ; for the great majority, free education, more or less available, has not produced major social and economic improvements.[5]

The Education and Cultural Values

One may define culture as a complex whole which includes knowledge, belief customs and habits as acquired by man as a member of society. Man is biologically endowed with physiological needs which must be satisfied. It is culture which determines how they will be satisfied.

New knowledge may only be put to use when old behaviours, beliefs and attitudes are unlearned and new, more appropriate replacements are learned. Motivation to change must be offered, and Likert and Lippert advance three sources of motivation for problem solving. These are :

1. Problem sensitivity—sensitize them to existence of Problem.
2. Image potentiality —give/build an image to aim for.
3. Attitude of innovation—present them with a variety of alternatives to choose from.[6]

Even more subtle than the casuality of the structures or power and property on education is the interplay of values reigning in the economic and political order and their necessary and conditioning reflection in the educational system.

This focus is the one which sociologists of the "symbolic violence school" are adopting to explain why the present school system, far from being able to promote social change, is the organ of "cultural reproduction" and of social perpetuation. Beyond the incapacity of the educational system to dilute class differences (incapacity demonstrable in many ways), is the proof that 'one is able to present the appearances of legitimacy at the service of legitimating the privileges."

This surprising affirmation is based on two social facts which are both concerned with the values upholding the cultural system. On the one hand, is the formal objectives which it adopts under the influence of the intentions of the social groups and classes, so that the effective "aggregate intention" of the educational system differs substantially from its formal ends. On the other hand more decisive for the socio-economic future of the student is what the educational system gives him in the affective and value order than what it provides in order of knowledge.

The educational system imposes on the student values determined by the power of property elites, and does this principally through its techniques of communication and by the network of interpersonal relationship within it. In the ultimate analysis the political-educational power becomes the decisive factor in legitimizing the cultural values which it represents.

On the other hand, the interpersonal relationships within the school (Type of authority, of control. of motivation and incentives, sanctions and role expectations) reflect the class relations which operate in the structure of production. A neocapitalistic economy will have a school system which reproduces, legitimizes and reinforces the values upon which the economic system is based. The relationship among students is

competitive rather than cooperative. That of teachers with students is authoritarian rather than democratic. That of students towards their school work, as of worker and employee, is alienating; therefore they do not participate in the divisions concerning the educational process because they are not motivated by learning and knowledge and therefore their educational success is measured by norms and sanctions extrinsic to the task itself. In short, these relationships and values correspond to an ideology proper to a neo-capitalistic economic structure.

Education has been the mechanism which guarantees the persistence, across generations, of a social, political and economic structure, in opposition to justice. The educational apparatus has become by its very structural design, a gigantic device of value pollution which maintains society's metabolism in a vitiated state so that the relations of production function "harmoniously"

Because of this, the present educational crisis in respect to justice in the developing nations is due to more than failures in strategy, scarcity of resources or certain characteristics of its bureaucratization or institutionalization.

It is absolutely essential that those who aspire to reorient education towards justice should commit themselves to a serious and persevering work of scientific research concerning the interactions of education and the other social processes. Only scientific research can provide the elements for a triple activity which in this moment appears absolutely necessary :

a) influence the agents who make decisions on educational policy ;

b) form a public opinion which exerts pressure for the changes referred to and accepts them, and

c) reorient the educational activities towards the unexplored paths which the times impose.

Education is a more effective carrier of values and attitudes than of knowledge.

In reference to Value education – Torpy says "Value can be defined as a normative conceptual standard of the desirable that enable an individual to choose among personally perceived alternatives of behaviour. Value education can be defined as value classification. An effective teaching of values, if we can use the word teaching properly here, blends together various methods to produce the psychological and social behaviours believed essential to value development. Value education is a strategy. It is designed in terms of personal learning, and, to a lesser degree, in terms of methods. It does not presuppose indoctrination, preachment, or moralization. Value education assume the dignity and worth of the individual and holds each "normal" person to have cognitive qualities which, if given a chance, can suggest very creative choices for value situations.

Value education involves such behaviour as identification, generalization, discrimination, clarification, comparison, contrasting, analyzation, affirmation. assimilation and commitment. An effective method of teaching values sees the teacher as a mid-wife, who does not start or stop life, but who facilitates it.

Values are probably never used or learned except under conditions of conflict. No value judgement is needed when there is only one alternative. Where there are at least two alternatives, a decision must be made regarding which is the better alternative. By definition then, a value conflict is a momentary impasse among alternatives, due to new awareness and lack of adequate information. The value conflict situation demands that one select some response which he believes viable for the conflict at hand.

Referring to *Development* Neehall says"...."the powerless' or the poor nations are not dormant. They are looking for ways to change their present positions with the powerful. They an establishing regional common markets, regional banks, and as the oil-producing countries have shown, they are pushing for agreements that make it necessary for the rich, consumer nations to accept their terms. The 'powerless' in the poorer countries are

also beginning to recognize that one of the best ways to counteract power systems of other conutries is to reject the concepts of development that have been coming from them. They are rejecting. for example, the idea of measuring development by an increase in the Gross National Product. Further, within the poorer countries there is growing recognition that some countries are very poor and need the support of those slightly better off than themselves. As the 'powerless' become increasingly aware of how they can influence the powerful, their decisions will have repercussions on standards of living, purchasing power and life styles of citizens in rich countries. It is imperative, therefore, that citizens in rich countries be educated to prepare themselves for change that will come about for the 'powerless' are not entirely motionless,

I emphasize the point therefore, that we of the third world need much sympathetic understanding. Some of the measures we will be forced to take will have repercussions that may appear to be negative to the wealthy. What is needed then is sympathetic understanding, authentic information and support, for ultimately there can be no liberation unless the process of justice originates with those who are now oppressed and suffering from injustice.

Butlimer says "In those educational institutions that serve a more fortunate clientele, (more fortunate economically) we must use the opportunity to create in these students a sensitivity toward social, racial and economic justice, and a sense of responsibility for those less fortunate; a sense of responsibility, also for the environment that development and economic progress are all too fast polluting and destroying. We need to create as well a sense of responsibility toward using the actual injustices over which they will one day have control, and a sense of political responsibility in favour of promoting a just society[7].

Education should be available on as wide a scale as possible; at lower and medium levels and in rural areas equally as in urban areas.

It should be made accessible by being open to all with as little financial expenditure to parents especially in the elementary and secondary levels.

It should be adequate in content and appropriate for rural children—ie. it must be agriculture oriented to a great extent in the Indian situation. Education should arouse awareness of responsibility to oneself and one's neighbour.

At the Government level it should be multi-faceted and integrated. The Departments of Education, Culture and Social Affairs, Information and Broadcasting, Youth and Industry and Health and Welfare should work closely together to give support and a comprehensive character to the whole programme of development.

According to Turner et al (1961), the objectives of education are often said to lie in the realms of :—

1) Self-realization
2) Human relationships
3) Economic efficiency, and
4) Civic responsibility.

Shifts In Approach :

Experience of two decades and a half of unimpressive development activity in the "Third world" necessitates serious thinking regarding both the social objectives of planning and the strategies of implementation. Some major shifts in approach are imperative. These shifts are from (a) conspicuous consumption to conspicuous austerity: (b) goods to services; (c) self-oriented values to society-oriented values and (d) present-orientation to a present and future orientation.

The counter-productive and dysfunctional aspects of conspicuous consumption are all to evident. The mounting revulsion against the basically unjust and unequal system of distribution will compel a thoroughgoing modification of the system. The ideal for the third world at any rate is conspicuous austerity. If this ethos is created the emphasis will shift from goods to services or from personal consumption to collective welfare.

Rather than concentrate on self-needs, the individual will merge them into the needs of the society. The reawakened social consciousness will lay stress on a common and ordered way of life characterized by justice, equality and fair play. Overconcentration on present-bound and proximate goals can, in the long run, have lethal effects. Thus it will be essential to relate time-bound programmes to chart the future one visualizes.

LITERACY

"Literacy is usually defined as the ability to read and write one's name in a language commonly used in the country where one lives. In India, for census purposes literacy is the ability to read and write a letter to a friend. Illiteracy is, of course, the absence of this ability. The literacy rate is usually given as a percentage of the total population 10 or 15 years of age and older. Literacy is important for economic development. The development of a modern economy requires a literate population, or at least a population of rapidly increasing literacy. All industrialized countries in the world today have high literacy rates for skills. Literacy is usually essential. Usually more women then men are illiterate. Low income, rural societies are associated with illiteracy."

Adult Literacy Rate is defined as the percentage of the population 15 years old and over who can both read and write, add a *School Enrolment Ratio* defined as based on the number of pupils enrolled in primary and secondary schools compared to 100 persons in the population aged 5-19 years inclusive adjusted for the normal duration of schooling in the particular country.

Literacy in India

OVERALL Literacy Rate in India

	Total	*Male*	*Female*
1961	*24. 0%*	*34. 4%*	*12. 9%*
1971	*29. 38%*	*39. 49%*	*18. 47%*

Female Literacy Rate	*Rural Areas*	*Urban Areas*
1971	*8. 54%*	*34. 51%*

A sample survey conducted by the National Book Trust shows that more literate women read books in India than do literate men. The women readers constitued 41 per cent more than men who accounted for only 26 per cent. Those who never read books at all comprised 24 per cent of women. An average of 11,220 titles are included in the Indian National Bibliography every year, one third of which are in the English language.

India is classified in the "Educationally Least Advanced Group of Countries" because less than half of our adult population is able to read and write and less than half of the school age population is enrolled in school.

This is a classification by Liu, taking countries with a population of over 5 million, and using the combined indices of adult literacy rate and school enrollment ratio. We thus have 3 groups :—

I Educationally Most Advanced

Australia	Germany, East	Sweden
Austria	Germany, West	Switzerland
Belgium	Hungary	U. S. S. R.
Canada	Japan	United Kingdom
Czechoslovakia	Netherlands	United States
France	Poland	

All these countries have adult literacy rates of 95 per cent or higher and, with one or two exceptions, school enrollment ratios of 75 or higher. They are all situated in the

northern, eastern and western parts of Europe, except Australia, Canada, Japan and the United States.

Educationally Less Advanced Countries

Another group of twenty-seven countries are classified as educationally *less advanced*, in comparison to the first group, but they meet our two minimum criteria for educational development: an adult literacy rate of 50 per cent or more, and/or a school enrollment ratio not lower than 50.

Argentina	Cuba	Portugal
Brazil	Greece	Rumania
Bulgaria	Italy	South Africa
Burma	Korea, North	Spain
Ceylon	Korea, South	Thailand
Chile	Malaysia	Venezuela
China, Mainland	Mexico	Vietnam, North
China, Taiwan	Peru	Vietnam, South
Columbia	Philippines	Yugoslavia

One-fourth of these countries are situated in Asia; nearly one-third are in Latin America; the rest are found in southern and eastern Europe and one in Africa.

Educationally Least Advanced Countries

Finally, twenty-four countries are classified as educationally *least advanced* because they have less than half of their adult population able to read and write and, with one marginal exception, less than half of their school-age population enrolled in school. They are found situated geographically, almost in equal numbers, in Africa and in Asia, with a large concentration in the Mediterranean or Middle East region.

Countries in this group are listed.

Afghanistan	Iran	Pakistan
Algeria	Iraq	Saudi Arabia
Cambodia	Kenya	Sudan
Congo (Leopoldville)	Madagascar	Tanzania
Ethiopia	Morocco	Turkey
Ghana	Mozambique	Uganda
India	Nepal	United Arab Republic
Indonesia	Nigeria	Yemen

Leiu observes that :–"Countries which are most advanced educationally tend to have lower rates of population growth than those which are relatevely less advanced in educational development" ; and "That there is no evidence of any significant difference in the population growth rates between countries in the educationally less advanced and those in the least advanced groups.

Countries which are educationally less advanced may be expected to have birth rates ranging from moderate to high levels when compared to countries which are relatively most advanced.[4]

Population Changes and Educational Development

The progress of education in the ECAFE region had been impressive over the previous two decades. Nevertheless, rapid population growth had impeded the spread of literacy and the improvement of enrolment ratios to pupil-teacher ratios. Although the adult literacy rate had improved between 1950 and 1970 in the high-fertility ECAFE countries, the absolute number of illiterate adults had continued to grow. It was estimated that the growth of population in the primary school age group would require an increase of over 50% in school facilities between 1965 and 1980 just to maintain enrolment ratios at their 1965 levels.

Because of the time lag between birth and school entrance, the short-run effects of fertility decline on school enrolments and teacher requirements were relatively small over the

first ten years but increased rapidly thereafter. The long-run educational costs of postponement of fertility decline were very large. However, the long-run educational savings from fertility decline did not mean that total educational expenditure would level off, since those savings would be applied to upgrade the quality and extend the scope of educational facilities and services. For that reason, in countries where fertility had declined rapidly, educational expenditure had continued to rise.

Rapid population growth also produced high school age dependency burdens, which forced many students to drop out. The high drop-out rate was thus a common feature of ECAFE countries with rapidly growing population. The percentage that the primary and secondary school age group (5-14) was of the working age group (15-64) was twice as high in the high fertility ECAFE countries as it was in Western Europe, so that the burden of a given level of educational expenditure per capita of ages 5-14 fell twice as heavily on the working-age population in the high fertility ECAFE countries as in Western Europe.

Because of the required expansion of educational facilities and personnel under rapid population growth, non-recurring educational expenditure was a large proportion of total educational expenditure and impeded efforts to upgrade the quality of existing facilities and services.

The question of the impact of rapid population growth on educational standards was brought up, and it was pointed out that although enrolment rations had kept up with or surpassed population growth in most countries, in some countries it had been at the cost of declining standards.[6]

Education

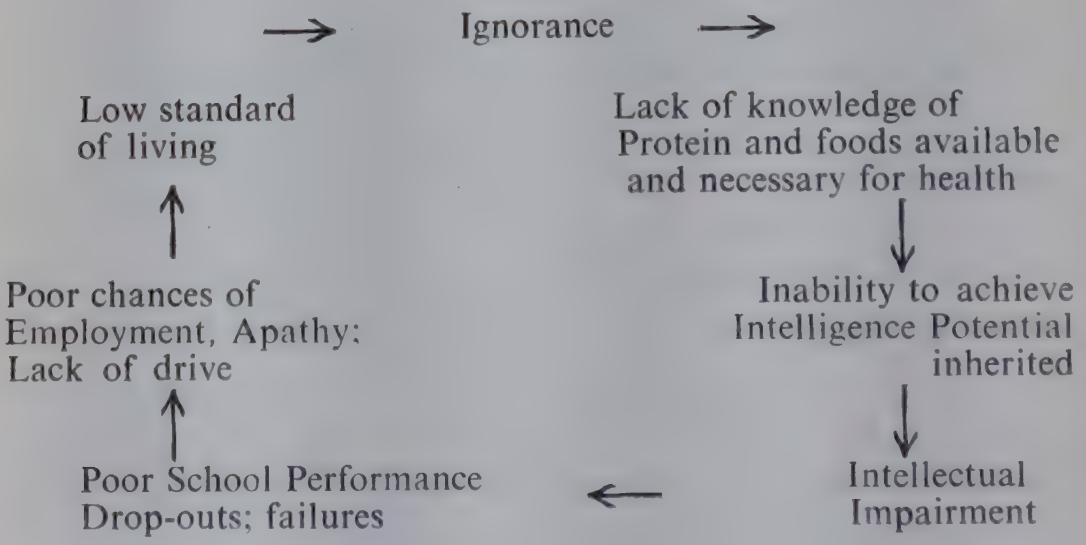
Each state is responsible for education under the overall supervision of the Central Ministry of Education. Where possible, education is both free and compulsory up to age 14. Schooling is divided into pre-primary, primary, middle and secondary grades. There were 62 Universities ; 1,322 Arts and Science Colleges ; 1,151 Professional and Technical Colleges ;

293 Special Education Colleges; 41 Research Institutions; and 3,971 Vocation and Technical schools in 1965. Literacy rates were 39.4% for males and 18.45% for females according to preliminary 1971 census results.

Communications

The number of radios in use in 1970 was 11.8 million (22 per 1,000 population) and there were 25,000 Television sets. In 1969 there were 650 newspapers with a circulation of 7.6 million, i. e. 14 papers per 1,000 population. There were 4,255 cinemas with a seating capacity of 4 million, i. e. per 7.4 1,000 population. The annual attendance was 2.2 million in 1969.

In February 1971 a satellite communication centre was established at Poona.


Ignorance
Low standard of living
Lack of knowledge of Protein and foods available and necessary for health
Poor chances of Employment, Apathy: Lack of drive
Inability to achieve Intelligence Potential inherited
Poor School Performance Drop-outs; failures
Intellectual Impairment

Ignorance can be said to be the root cause of the situation prevailing in developing countries to such a great extent. It is part of a self-perpetuating and therefore vicious circle.

To the difficulties of varied ethnic composition, one must consider the barriers, that language and religion provide, to the establishment of an effective educational system.

Language

The official language is Hindi which uses the Devanagari script. English is used as an associated language. Sixteen regional languages are officially recognised. There are several hundred dialects.

Religion

The 1971 Census shows that there were 82.72% Hindus, 11.21% Muslims, 2.60% Christians; 1.89% Sikhs; 0.70% Buddhists and 0.47% Jains. Scheduled castes account for 14.60% of the total population and scheduled tribes 6.93%.

It is interesting to note that various religious groups have different literacy rates.

The destiny of India is now being shaped in her classrooms. In a world based on science and technology, it is education that determines the level of prosperity, welfare and security of the people. On the quality and number of persons coming out of our schools and colleges will depend our success in the great enterprise of national reconstruction, whose principal objective is to raise the standard of living of our people.

The Education Commission of India (1964-66) begins its report with this statement and it certainly is cognisant of the fact that we have 40% of our population of 547 million (1971 Census) below 15 years of age.

The education of this group is crucial and must be carefully planned, executed and evaluated.

Rural Illiteracy

In India there are 66.3 million youth residing in rural areas. Here, the social system is 'closed' and impenetrable, and the introduction of new techniques and innovation seems to come up against a wall. However, since the advent of Community Development Programmes and the increasing influence of urbanisation through the growth of industry, especially in the villages on the periphery of the cities, the earlier scene is undergoing a change.

Rural youth have been found to express a preference for non-rural rather than rural occupations, as also for occupations different from the caste and family occupation. In a study of youth from 4 rural schools, Mehta (1969) found that 73.51% of the boys wanted to pursue an occupation different from the parental one. The alternate choices given were for government service, magistrates or mechanics. On investigation of those who wanted to pursue their fathers' occupations, it was found that the fathers were either in salaried jobs drawing over Rs. 200 per month, or they were profitable businessmen or traders. This reflects the facts that only those boys whose fathers were well settled, either in an established business or in profitable agriculture, expressed a desire to continue in the parental occupation.

Another interesting observation was that the sons of farmers and those from high caste families were keen to take up government jobs, while youth from low caste families were more attracted to career in the armed forces.

Though there are differences in the attitudes of parents and youths on the issue of education, there was considerable intrafamilial agreement on the value of education. In cases where the older generation of the family thought highly of education, the younger generation did so as well and vice versa.[9]

The United Nations hold that until at least 50% of the population of a developing country is literate, the achievement of self-sustaining economic growth will be extremely difficult.

Even if this proportion is regarded as high in view of the possibility of new methods of instructing illiterates, nevertheless there is an urgent need for the expansion of literacy and education in the less developed regions of the world.

Investment in human resources is as necessary for agricultural and general economic development as investment in the material means to bring these about. No real, truly human progress, no social advances will be possible without raising the

standards of overall education in the developing countries. It is one of the most important factors in development. It is, of course, much more than that. It is a basic human right. As the encyclical on Development of Peoples says :—" Hunger for education is no less debasing than hunger for food – illiterate person is a person with an undernourished mind. To be able to read and write, to acquire a professional formation, means to recover confidence in oneself and to discover that one can progress along with others."

Improvement in agriculture, improvement in industrialization, improvement in administration — all these things depend on education. At present there is an insufficient supply of trained people of the developing countries for these tasks. That is why technical and capital assistance from developed countries is so important.

The low literacy rate also explains the imbalance, with grave political consequencesa lready indicated, between a comparatively small educated elite and the mass of the population that is uneducated and illiterate.

In 1963, the director general of UNESCO said that there were 700 million people estimated to be illiterate, namely, two-fifths of the population of the world. The great majority are in the less developed countries.

A certain degree of education makes people more willing to change accepted patterns of social behaviour if given sufficient reason to do so. Second, education itself presupposes that a certain change in outlook has already been accepted. The parents are prepared to let their children go to school instead of requiring them to work and become productive either on the farm or in jobs in the city as soon as they are old enough to do so. The fact that education, furthermore, involves expenses for school fees, books, extra clothes, and similar items also means that parents may tend to want fewer children.[10]

EDUCATION AND FERTILITY

"The impact of education is beyond doubt. No study of either motivation or manifest differential fertility has failed to show that, *when other things are equal, the more educated have smaller families.* The cost of education may also deter parents from having too many children, and compulsory education, even when free, reduces child labour and makes children into less of an economic asset than they are often thought to be." [1]

Education is given high priority by Easterlin (1973) who includes it in the process of modernisation which is directly related to fertility control.[2]

Several experts including Muhsam[3] have stressed that education seems to occupy an outstanding position in the determinants and consequences of population trends. The educational level has been claimed to account for over half of the total variance in fertility between a large number of countries at various phases of demographic transition and four times more than all the other variables taken together.

Education influences fertility directly or indirectly, perhaps in the latter way more extensively.

Educational Status & Fertility

The studies which have analysed the relationship between fertility and educational status differ in their findings. Literate and illiterate women in urban and rural Poona District are found to be little differentiated in reproductive performance; on the other hand, from census data, Kingsley Davis finds that there is a curvilinear relationship between the number of living children in various castes and the percentage of their women who are literate. The survey of Mysore reports the following difference in average completed family size among women whose first marriage was unbroken: six children for those having less than a high school education; five children for those having a high school education: and two children for those having a college education.[4]

The educational level of women is more significant than that of men. In towns and cities the effect of education on fertility is more pronounced than in rural areas. Although higher educational levels generally accompany low fertility, the most highly educated groups in the US and in some European countries are an exception to this rule. Occasionally, in these countries, particularly low fertility is found among those with a very low standard of education.

Educations' effect of fertility is linked with general economic development, conscious motivation to have fewer children, and the means to do so.

A family planning programme can only be successful in the midst of other social and economic changes that cause a veritable intellectual revolution. A family planning programme cannot be pursued in a vacuum; it must be based on the pre-existing desire of the population. Before the population comes to this desire not only have the advantages of a reduction in fertility to be seen, but even a completely new idea of existence

has to be entertained. A man must be aware of what he can do with regard to his own fate. Then there is no longer a fatalistic attitude toward the world, mixed with superstition, but a reasonable and voluntary one. **Man must see that it is more human to plan his life, even his fertility, rather than go by instinctual urges or old social patterns, leaving the result to fate or to providence.**[5]

Educational development, as well as being affected by population change had reciprocal effects on fertility, but it was noted that those effects did not appear to be very large on the national level unless educational development was accompanied by economic development and a corresponding transformation of the occupational structure.

In this regard, it was noted that more study of the kinds of education most effective in simultaneously reducing fertility and maximizing socio-ecanomic development was needed. The case of the Philippines is mentioned where, in spite of high educational levels, fertility was extremely high. The importance of female educational levels for fertility behaviour was also mentioned, and it was noted that female enrolment ratios had lagged behind male enrolment ratios in the region. The importance of tailoring educational development to the needs of economic development, as also the broader importance of education as means to developing the full human potential of the individual, not just his economic potential, must not be lost sight of.[6]

Total Fertility by Educational Status of Women

Educational Status in Ghana [7].	*Total Fertility*
No Education	6.24
Elementary	6.41
Secondary	2.90
University	4.08

In India the National Sample Survey has shown that the average number of children per woman is 2.0 if the

woman has passed the intermediate and university examinations; 4.6 if she is a matriculate, and 6.0 is she has no school education. The woman is the main educator of her own pre-school child, and shares to a considerable extent, often even dominating, in the educational process of her children.

A clear inverse relationship between education and fertility was established at all ages and in most marriage durations in Japan in the 1950 and 1960 censuses, as well as in a survey carried out in 1966. A similar inverse relationship was found in the USSR and the USA. In the USA the differentials have tended to become narrower since 1940 (eg. for urban ever-married white women aged 25-29 years, differences in fertility diminished by more than one third between 1940 and 1960). Present indications are, however, that the phenomenon of educational differentials in fertility in the US will not disappear altogether in the immediate future, in view of the fact that since 1950 the differentials have remained stable or even increased among young women (white women under 25 years of age and non-white women under 30 years who have ever been married); the Current Population Survey of 1964 also revealed the persistence of an inverse relationship of fertility to educational attainment.

In both Japan and the US the educational level of the wife is a more significant variable affecting fertility than the educational attainment of the husband. In the US the differentials were narrower among white women than non-white, in urban areas than in rural areas, and in rural non-farming areas than in purely rural areas. On the other hand, several surveys on attitudes towards family size in the US have disclosed that preferences were more or less uniform for the various educational groups.

In several European countries, such as England and Wales (1951) and Sweden (1935-1936), it was found that the level of educational attainment was inversely related to family size. More recent studies, however, have shown a U-shaped curve for the relationship between fertility and education. The 961 census for England and Wales indicated that fertility was

highest in marriages in which both partners left school before they were 15 years of age. The 1960 census in the Netherlands seemed to indicate a similar pattern.

In a French survey and a Danish study, a more pronounced relationship was found between fertility and the level of education of the wife than between fertility and the level of education of the husband.

An inverse relationship between the level of education of the wife and fertility was consistently established in Hungary and in Canada with the sole exception for women with a college education whose husband had a University degree or were above a certain income level.[8]

It is not easy to distinguish the influence of education, as distinct from that of the cultural and socio-economic environment generally, upon population growth. But a comparison of the Birth Rates of different countries and the structure of their educational systems shows a correlation between broader and more developed structures and lower birth rates. To some extent - this is caused by a dual phenomenon, namely, that at the income levels of developing countries, birth rates tend to decline as income increases, while at the same time, the higher a country's income, the broader is its educational base.

The *effect of education* on the birth rate operates through the changes in attitudes and behavioural patterns produced on the population as a *whole*.

Likewise, in commenting upon the role of education in fertility differentials, Ronald Freedman stated : One plausible explanation suggested by D. M. Heer and others is that those who are literate and in an active network of communication are able to receive information about the ideas and means of family limitation. This is very probably correct, but the role of education, literacy and communication may be more basic. With increased education and literacy the population tends to become involved with the ideas and institutions of a larger modern culture. If the individual is, or believes he is, part of a large

non-familial system, he begins to find rewards in social relationships for which large numbers of children may be irrelevant."

Analysing "percent of demographic transition completed" in relation to selected variables for a large number of countries of the world, Donald J. Bogue found the suggestion that "using educational levels, increased school attendance, and elimination of early marriage are much more powerful in promoting fertility reduction than simple urbanization and rising levels of living. A major driving force behind fertility control appears to be education. . . It is also noteworthy that educational level alone accounted for 56% of the total variance in demographic transition. Adding all the other variables managed to account for an additional 16 per cent."

Kiser states "The subject of educational differentials in fertility to the fertility transition is important because about two-thirds of the population of the world live in developing countries where fertility rates are high and educational levels are low." [9]

Education also plays an important part in helping restraint. In Latin America and in Taiwan, as throughout the developing world, people with several years experience at school or university tend to produce smaller families. At the very least, education postpones the onset of childbearing and makes family planning advice more accessible. Its more positive tendency is to demonstrate the social advantages of smaller families. For better or worse, social advancement and educational ambition have been powerful influences in stabilising the population of advanced societies. [10]

SEX EDUCATION FOR THE ADOLESCENT

The Changes in Adolescence

Adolescence is the period of life between Childhood and Maturity. The child becomes an adolescent when the secondary sex characters appear. The Primary sex characters are present at birth seen as the genitals or the sex organs. The secondary sex characters are manifested at Adolescence or Puberty as the menstrual period, the development of the breasts and the typical hair distribution in the girls. In the boy it is manifest in his voice change, the moustache or beard growth and in wet dreams.

In India a survey done shows that Indian girls tend to become Adolescent or attain Puberty at 12 years. The exact age for boys is not known as the adolescent change is more gradual, in boys, than in girls.

These adolescent changes are due to the secretions of the sex glands known as Hormones, produced by the Ovaries in the Female and the Testes in the Male. These glands mature at Puberty. These changes give an explosive quality to the adolescent problems, which are both Physical and Emotional

and come like a challenge to the youngster in this period. It is for this reason that both doctors and psychologists advise parents to prepare their children for the adulthood or maturity that they have reached. It has been proved that when a boy or girl is unprepared for the physical changes that descend so suddenly on them, the emotional trauma, usually felt as a sense of guilt, is great enough to leave a permanent scar in some cases. It has been said that it is better to be a year earlier than a day or two late in instructing the youngster.

In adolescence the first challenge comes from the body. The adolescent no longer recognises himself. The boy, who is 5' 3'' and suddenly in a relatively few months finds himself approaching 6', does not feel that his body is familiar to him. He does not know what to do with his hands or his feet. He must learn to be a new physical self. Clumsiness is therefore a leading feature of adolescence. The loss of his sense of sureness will often hurt or upset the adolescent and ridicule must be carefully avoided at this stage.

The second challenge comes from changes and new body sensations which strike in all their rawness and intensity. The adolescent senses he his different. He feels alien to himself. He becomes very sensitive to stimuli. He feels rudeness anger, kindness and love intensely. He is tautly strung, inclined to be touchy and go " off the handle " very easily as the expression goes. The adolescent boy may feel upset easily if he thinks he is not sufficiently masculine or manly in appearance. He assiduously avoids any action which may label him a sissy.

From his childhood admiration for his father, he may now often start to ignore his father, to prove his own self-sufficiency, and tend to show off his own skills and strength to his mother, sister and other girls. He may start boasting to bolster up his ego. If he does not get the attention he wants, he may even try to hurt, annoy or get into scraps to get the attention of his mother in particular and his family, focussed on him. This type of love is sadistic and finds gratification only when the loved one is hurt, Within limits this feeling is normal but parents

should not allow the stage of children hurting them to get attention to be reached.

In the adolescent girl the changes are more swift, and in order to keep up with the sudden and tremendous physical and emotional transformation, she tries to put on an air of sexual maturity like an armour. The pseudo sophistication can be easily discerned by knowing parents.. She may tell lies openly to give herself a feeling of importance. Every male is a challenge to her charms, which she tries to practice first on her father. She will often be coquettish and sly, and may ignore and defy her mother. Every feeling has an aim, and this is well recognised psychological one, to break her attachment with her mother, in order to function as an autonomous individual first and then in preparation for her own marriage later on. She usually chooses one girl friend with whom she may become inseparable, and they discuss sexual matters with each other. Adolescents are continually discovering themselves.

Parents must be most careful not to exaggerate and thereby aggravate the situation. The mother-daughter relationship is often put on severe strain and for mothers who at this time are themselves undergoing or nearing the change of Life, the situation often becomes unbearable and full of tension. The mother and daughter tend to frequently quarrel. This period understandably call for great adjustment by both the adolescent, the parents and the teacher in school. The adolescent feels " I am not a child any longer but neither can I understand and manage myself".

While psychologists agree that a child's personality is formed by the age of four or even earlier, I would go on to say that this personality is crystallized in the important stage of adolescence. Though lack of affection and security in childhood leave their mark, the growing mind like the body is resilient within limits, and an early developmental pattern may be modified in adolescence. To put it in another way, the adolescent gives his parents a second chance to make up for past deficiencies when these have occurred. If these deficiencies are

allowed to persist they give vent in explosive tempers, aggressiveness (shown commonly in school towards the teacher and other boys) grudges or fears, which may later form the basis of neuroses if unchecked. The response of an adolescent in school to his teacher and his studies and friends and the community is a reflection of his own parents response to him in the home. Parents must realise that it is their prime responsibility to guide and help the youngster. Teachers may supplement this guidance.

The child by very reason of his physical inability gets all the help of his parents. The child can truly say of them : "They ran to help me when I fell : they listened to all I had to tell". But how many adolescents can say the same when they need help, be it physical or emotional ?

The adolescent energy is tremendous and must be channelised into study, sport and hobbies that act as a release or outlet for physical and emotional or sexual tension. If this outlet is not provided, he may resort to nail biting, twisting of a hair strand, overeating, a rise in blood pressure and even experimental sexual play.

The older adolescent is in a fluid state and tries to find an identity. He or she may imitate their favourite film star, sports idol, teacher or even companion. They tend to daydream and to create imaginary situations in which they always emerge triumphant. They may appear vague at one moment and be ready to erupt into an emotional storm at the next. The parents and teacher cannot dismiss these feelings. They have to show that they are in sympathy, be calm and stand up to the test with tolerance and understanding. The adolescent often puts his parents to the test to guage their support. If they fail to behave with the maturity that he expects of them, he may despise them. When they do equal his expectations, he will always bring his problems home to his parents, rather than take to friends and companions ill equipped to deal with them.

Over protection must be avoided, as it can lead to suppression of initiative and an adventurous spirit. But some parents give their children all the efficiency without love. That is

to say, they give them a comfortable home, good food and regular pocket money, but little or no companionship or affection. The parents must set a high standard of behaviour, Adolescents respect the parent who can say " no " to a demand which they secretly know is not good or reasonable. The parents must also be able to explain their reasons for refusal and listen to the youngsters' side.

The intelligent adolescent is often expected to do wonders in school by his parents. They keep egging on the adolescent at school or college for reasons of personal selfishness, to win honours so that they (the parents) can stand out in the community. Parents and teachers must appreciate that when physical growth is at its height as in the adolescent spurt, the school work may suffer. This is explained by all the energy being expended on physical growth with little energy left over for mental or intellectual growth. Forcing the pace of mental growth can be extremely harmful. There are such wide ranges even among normal, healthy and intelligent children, that it is very difficult to pronounce a definite judgement on what is the right test for a certain level of intelligence,

From kindergarten throughout the formal education of the child the teacher is probably the single most important influence exerted by the school on the child and therefore good methods in teaching and an understanding approach make not only for a profitable experience, but also for a joyful one. Each student must be at his proper level, and must further his development according to his individual capacity. And every encouragement should be given so that the environment both at home and in school is favourable for this development. Home–School-College understanding and cooperation are generally accepted as a basic requirement for smooth continuity of growth.

While mixing with the opposite sex can be certainly allowed, single couple dating and meetings in lonely or doubtful surroundings or atmosphere will only be dangerous in heightening the sexual tension already present. Here we come to the grave duty of parents in imparting sex education to their children and this will be dealt with next.

Knowledge and Responsibility

The knowledge which has brought us power over human generation has brought with it one of the most portentious problems of modern society. Whether or not mankind shall be reproduced becomes in a new sense a question of volition, and consequently a question of responsibility. But the power to choose has come so suddenly that the sense of responsibility seems as yet inadequate. The new knowledge strains the old traditions. In other words it involves a moral problem.

Alarmed by this situation, some persons demand a ban on knowledge. But the problem is not to be dealt with so summarily. There is no likelihood that it can be solved in reactionary fashion by exhorting the people to forget what they have learned and walk in the old ways, and by setting the police on them if they refuse. On the contrary, it is virtually inconceivable that the unsetting knowledge will be lost or the perilous power wholly relinquished. All over the world the trend of events has seemed to exclude such a possibility.

It thus becomes expedient to accept the knowledge, and to bend our efforts to working out new standards by which exercise may be made to yield a clear preponderance of benefit. This is indeed no simple task; but its difficulties, viewed in a long perspective which even now we begin to see, may prove to be mainly difficulties of transition.

Meantime, the transition is none the less critical; for the numbers, and yet perhaps more the quality, of the race are at stake. If the readjustment is to be accomplished without excessive shock, it is imperative that the process of birth and the means of birth control should be made known wisely and temperately, and only so fast and so far, as experience can bring with them the compensating influence of a readjusted sense of responsibility.[2]

Ideal Source for Sex Education

The seeking of their sex role and to identify themselves with this role is of major importance to the adolescent and it is here that sex education from the parents serves an important function.

Before the days of mass communication the moral standards were largely set by the family and community. Although sexual deviation undoubtedly occurred it met with no social tolerance, and when detected was visited by considerable social penalties.

The magnitude of changes taking place in society today and the disruption of family life and religious practice has further confused the youth today.

Part time parents give less time to their children, when they should be giving more and more in order to share their problems, guide them and channelize their sexual energy.

At a time when the interest for the other sex impulse emerge as new factors of interest and concern, sex education aims to help young people to acquire such knowledge and attitudes which will enable them to enter into healthy relationships with other members of the opposite sex. The sexual instinct when first experienced is not directed toward the opposite sex in childhood or early adolescence. It is experienced as a strong creative instinct with a tremendous surge of energy.

The home is the ideal place for telling the story of life, for parents have a continuing relationship with their children on this subject.

They are the ones who care most about their children, and who provide a buffer between their children and the outside world. The parents are accessible when the child wants to ask questions. Family life also affords many natural opportunities to increase gradually a child's understanding of the normal place of sex in life. Parents give their young child sex education many years before they can begin to give him or her sex information; because whether they are aware of it or not parents are

giving their children sex education from the moment of their birth by the way they deal with them and by the home atmosphere with which they surround them.

Parents can help the child to develop standards of personal conduct and the strength of character to maintain them. They can help him form values which will enable him to make wise choices. He will need these if he is to succeed in directing his own strong biological urges wisely and in meeting the conflicting ideas of his peer groups. Dr. Carlfred B. Broderick says, "If getting children to internalize a responsible sex ethic is difficult, it is no more so than the responsibility to protect one's youngsters from sexual involvement and possible exploitation."

Parents have the responsibility of: (1) letting their children know that they are loved, wanted, and accepted for themselves, (2) understanding the growth and developmental changes occurring in them, (3) acquiring scientific information and a vocabulary with which they can express themselves with ease in talking about sex, (4) learning how to answer questions relating to sex simply and directly, (5) establishing a continuing relationship with each child so that he feels free to ask any questions which are of concern to him as he matures, (6) directing youthful energy into wholesome constructive channels, (7) building sound attitudes toward sex and high standards of conduct, (8) helping children become independent, responsible persons, and (9) showing by their lives day by day how the well-adjusted adult views the whole subject of sex and fits it into its proper place in life's general scheme. Young parents are assuming these responsibilities in increasing numbers. They are better prepared to do so than were earlier generations of parents.

Parents and other adults who are seeking a sound approach to sex education need to know that there is no one approach or method that is always right for all children. Yet there is a basic core to sex education. It is the continued, reassuring love of friendship that parents, teachers, and youth leaders give to the children or youth under their guidance. Many adults who wish to help children form sound ideas about sex are

uncertain how to go about it. An awareness of the fact that daily life is full of natural opportunities for sex education will make their task easier. Many opportunities occur at home, others arise from the child's own experiences at school or in the community, or from events in the news. The way people act in adult life is strongly influenced by the experiences and training in the home in early childhood. The growth of capacity to love as a mature person depends very much upon the child's relationship with both parents. It has been said that the love of the husband and wife for each other and for their children is the very essence of good sex education.

Ethical Responsibilities

It is surprising to note how very few parents are aware of their ethical responsibilities to their children in the area of sex. Dr. Michael Scofield, in his famous book "Sexual Behaviour of Young People" gives us an idea of the extent of ignorance regarding sex among young people in England. The mean age at which a boy learnt all the facts of life was 12.5 years, and a girl 12.2. Very few found out under the age of 10 and virtually all by the age of 15. Father and mother were the source of knowledge for only 11% of boys and 29% of girls, teachers for 12% of boys and 18% of girls, but friends for 62% of boys and 44% of girls.

If sex instruction had not been given by the parents by the time the child is 12 or 13, it was unlikely that they would ever do so. Middle class children were more likely to learn the facts of life earlier than working class children (this contradicts the belief that sex is talked about more simply and naturally in working class homes): 67% of boys and 29% of girls had never had any advice at all about sex from their parents. Even when it was given, it was vague and unspecific. In schools, some 86% of girls received some kind of formal sex education, but only 47% of boys did.

Very often the reaction of parents, when asked questions about sex, make the child feel that something is not

quite right. Adults need to realise that the first questions which children ask about sex are without emotion. The children should not be put off. Children should feel comfortable when asking the questions and the parents should feel comfortable when answering the question.

Parents require help and guidance to educate their children. Parents unfortunately do not perform this task responsibly. Some are overwhelmed by its implications, most lack confidence about their ability to deal with youth on such a 'delicate' subject, and yet they leave it to others to do - friends of the same age as their children sometimes teachers and very often, to the media which are not only unsuitable but often have the wrong focus.

Ideally, the school should supplement and build upon the firm foundation relating to sex already laid in the home. Sex education must skillfully combine the triad of Love, Sex and Marriage, and Family Life into a course which is oriented to the total personality of the man and woman. Special care must be taken to provide the course for students who leave before graduation and who go straight into jobs from school. Evening classes may sometimes be helpful and may solve the oft heard complaint that the syllabus is too tight to allow for another subject. These can be held in addition to the ordinary day classes but attempts to fit this subject, in view of its importance must be serious and consistent with the importance of the subject. The following topics are suggested for inclusion in the course at college level :

1. Normal Growth and Development. 2. The Biology of Human Reproduction. 3. Male and Female Psychology. 4. Character Formation. 5. The Family as a Unit of Society. 6. The Development of Correct Attitude to and Values in Life. 7. The Role of the Students in his own Home. 8. Interpersonal Relationships at College, 9. Interpersonal Relationships at Home in Society. 10. Problems of Sexual Deviation (eg. Masturbation etc.) 11. Juvenile Delinquency and Problems of Young Adults. 12. Professor-Parent Relationships. 13. Student, Parent Counselling at High School level.

Suggestions to Teachers

Suggestions to teachers concerning direct sex instruction :

1. Establish a warm, friendly, open-minded classroom climate free of embarrassment and self-consciousness, in which students feel free to discuss problems which concern to them.
2. Discuss matters relating to sex in a direct, unemotional and unembarrassed manner. Talk in the same objective, matter-of-fact way as in dealing with other subjects.
3. Acquire an adequate scientific vocabulary.
4. Emphasize the normal aspects of sex.
5. Develop an appreciation for the body.
6. Seek to build fine attitudes and understandings which will enable students to make wise choices.
7. Think through problems with students and let them draw their own conclusions.
8. Give appropriate facts because understanding helps to eliminate excessive curiosity.
9. Let students participate in planning the units.
10. Use a question box in which students may put questions anonymously, if they do not feel free enough to ask questions in class. Class discussion is better, but this is one technique of getting a class started on the way to free discussion,
11. Use films and other visual aids to help clarify.
12. See that adequate and carefully selected books in this area are on an open shelf in the school library.

Sex education is sometimes held responsible for the high illegitimacy and abortion rates. But unmarried mothers and girls who have had an abortion have had little or no sex education from home or school.

"Ignorance does not seem to prevent sexual activity, but rather promotes the undesirable consequences of sexual behaviour-unwanted pregnancy, unwanted maternity and venereal disease."

Cultural Patterns

It is obvious that educational innovations which affect human relationships would have to take into account the varying cultural traditions of the people, as well as the milieu in which they live. For a country like India, this would be a most fascinating and formidable challenge. For it is inevitable that in a nation of over 550 million people, there should be wide-ranging variations in social and cultural patterns influenced by religious beliefs, and ethnic, geographic, economic and other factors. India is a secular state where no religion has been given an establishment status, but Hindus form about 83.5% of the people, with 10.70% being Muslim, 2.44% Christians, 1.79% Sikhs and smaller minorities of Buddhists, Jews, Parsees and others. The origins of Hindu attitudes towards sex and marriage stem from the remote Vedic age. Over the centuries, these traditions have been formed and transformed, and poliferated into a bewildering variety of expressions. But, nevertheless, there is fundamental unifying influence which permeates them all and has developed into a recognisable 'culture' and a living tradition.

The ancient Sanskrit classics cover an amazingly wide range of human activity and aspiration. In the realm of daily living, the Shastras provided guide lines which still exert an influence on the people. The Dharma Shastra dealt with religions and philosophic life, the Artha Shastra with the acquisition of material wealth and prosperity and the Kama Shastra with the knowledge of love and sex. Vatsayana in his Kama Sutra (thought to have been composed anywhere between the first and early fourth century) said that a man should practice Dharma, Artha and Kama in such a manner that they harmonized. He also affirmed that 'Kama' was a subject which required to be learned and could not be left unstudied. What is very significant is that he affirmed that this applies to both men and women.

But although in the earliest ages of India's civilisation, an open and liberal attitude prevailed towards life, and women had many rights, an increasing Brahmanical influence introduced strong elements of asceticism, and later on, until the modern era, life became hedged in by constraints and rigidities, at least among certain sections of the people. Nevertheless, one can say that, in general, the basic attitudes of Indians are steeped in an acceptance of sex as an important, pleasurable, and reverent part of life in its wholeness.

But even though, by and large, there is a wholesome acceptance of sex, the ignorance about the subject among most people is just as great or greater than elsewhere, and there are huge gaps in scientific knowledge which are often filled in by harmful misconceptions or sheer prejudice !

Even though the cultural base has to be considered, a dynamic family life education programme must be innovated, helping to bring about a re-orientation of values and concepts and equipping young people to adjust and respond to new opportunities, and the new role opening up to them under the impact of development and modernisation[6]

The imparting of sex education provide an excellent opportunity for parents and teachers to convey a sense of values to the adolescent ; values that show the importance and dignity of sex, the power of sex, and its healthy and proper channellisation in adolescence in physical sport, and later within marriage.

Sex education is also character building, fostering a sense of responsibility and selflessness, which together will enable our young men and women to accept their respective roles in marriage with respect for their partner's wellbeing.

Sex education involves much more than relating the facts of life. It is only as good as the attitudes it develops in young people about family life, marriage, children, their own bodies and the way love is expressed.

Youth is not such a carefree and joyful epoch as some people imagine it to be. In a society where sex consciousness, double standards in their elders sex conduct, and conflicting opinions on premarital and illicit sex relations exist, youth must be given a strong pillar to anchor himself to, or drown in the ensuing disaster.

"It is the responsibility of the parents and teachers to see that the institution of the family and the school do not reflect the emptiness of society, but rather that they train their youth to fight the evils of society."

Indian youth has not reached the point of material satisfaction attained or available to western youth, but our goals in India are like those of the developed countries.....let there be things and more things.

"Greater facilities in education are being increasingly provided, and more and more branches of arts and science subjects are made available, but the roots are neglected."[7]

Promiscuity and increasing sexual permissiveness are becoming commonplace in Indian towns and cities. Venereal diseases in youth are on the increase all over the western world. And now sadly so, venereal diseases constitute a sizeable public health problem in India. The percentage of positive reactors to syphilis in surveys carried out among healthy people and expectant mothers has been found to vary from 5–8%, means 5000 to 8030 per 1000,000 in the adult population. Gonorrhoea, chancroid, lymphogranuloma venereum and ranuloma inguinale are all prevalent in India. Syphilis is more prevalent in large cities, ports, industrial areas and in the sub-Himalayan region. Surveys conducted in Himachal Pradesh, the Kulu valley, Jammu and Kashmir, and Jaunsar Bawar area in Uttar Pradesh revealed a prevalence rate ranging from 30 to 40 percent [8]

About venereal disease in the U.S.A. it is of interest to know and not a little alarming that "close to 2 million people are under treatment for syphilis, one half of whom are children, i.e. under 18 years. And that for every case of syphilis

under treatment, the careful estimate is that there are at least nine undiagnosed. In a random sampling of 35,003 who went through railroad depots, airports and department stores in Philadelphia a few years back and were asked to give a sample of their blood, and did so, 11% were found to have syphilis and did not know it. Young people under 25 years are responsible for more than 56 per cent of all reported cases of infectious venereal diseases.

It is not coincidental that those areas of the country which report sharp uprising in venereal disease among youth, also show a jump in their rates of juvenile delinquency. It is all part of the same behavioural pattern. In U.S.A. males between 20–24 years and females 18-19 years show a peak for Gonorrhoea.[9]

POPULATION EDUCATION

" Human History more and more become a race between education and catastrophe "

—H. G. WELLS.

Population Education is necessary for in today's world we want our youth to understand the serious world situation, the problems incurred by growing populations of the world and to acquire the knowledge that they can play an active part in national and international development and social justice. The responsibility (for fellowmen) can only come with the knowledge of how their fellowmen live and the need for all to share the resources of the world fairly.

There is an " inertia factor " in the dimension of time, which causes the full effect of a change to become completely manifest after a hundred years (or three generations later). The psychological explanation for this phenomenon is that human behaviour is for a large part conditioned by the unconscious which itself is largely formed by the education and the experiences of the first years of life. Therefore, it is the third generation brought up

from the earliest childhood in a community that will give the most faithful expression of the degree of social change.

In this context education can play a major role, and should begin as early as possible and feasible.

" Youth are the population decision makers. In most societies, young people between the ages of 12 – 24 years in school or out of school, take, make, or have made for them a series of decisions which have major population repercussions. *En masse* these decisions influence and shape the rate of population growth and the pace of urbanization. Some of these decisions are : when to leave school, when to marry, when to have the first child, when to have subsequent children, when to cease this process and whether to migrate to or from the city.

Such decisions are the province of most youth. In a cumulative way answers to these questions build individual and family population life cycles and very much determine an individual's or family's quality of life."[2]

" A reorientation and redefinition of the content and structure of education systems in order to create a sense of social responsibility among youth, to emphasise national development needs, to avoid producing a sense of elitism among youth, and to offer useful and valuable as well as socially and culturally relevant educational experiences to all those of school age".[3]

In the present Education system of India there is :—

1) No systematic teaching of population dynamics,
2) Insufficient awareness of the problem of over-population due to Lack of kowledge of facts and their effect on the individual,
3) Awareness or consciousness of over-population is not followed by action to combat it.
4) Moreover individual action to tackle problems have been under-rated.
5) The Education of youth is not future—oriented.

Goals of Population Education

The UNESCO workshop on Population and Fertility Education (in Bangkok, September/October 1970) suggested that Population Education be planned to assist the student to acquire

a) Basic demographic concepts, processes and methodologies.
b) Static and dynamic descriptions of population situations at the micro and macro level
c) The determinants of population growth
d) The consequences of population growth
e) The human reproductive process as a basic for understanding human fertility,
f) The national and international population policies and programmes. And to develop :—
g) Rational and responsible attitudes and behaviours towards family size and national population programmes.[4]

" The population problem has to be checked from many fronts of which Education is one. The relevance of population to the school curriculum is undeniable if Education is to be relevant to life situations and not just merely the inculcation of new members of the society with traditional values."[5]

Education as a non-medical approach to the problem, is particularly relevant in developing countries where great emphasis is laid on education for the youth as the key to self-betterment. An *education* that *arouses, enlightens* and *makes man aware of his potential and his awesome power of creating life* To direct this power responsibly and intelligently is the task of educators, be they teachers, parents or others concerned with Youth.

The Workshop defined Population Education as an " *Educational programme which provides for a study of the population in the family, community, nation and the world with the purpose of developing in the students rational and responsible attitudes and behaviour towards that situation.*" It also suggested that " Population Education should be viewed as a phenomenon to be understood. This understanding will provide the basis for perceiving

when and if the country has population problems, what the nature and the dimensions of the problems might be, and for planning and obtaining support for whatever policies might be, necessary in order to deal with the problem once defined."

On the macrocosmic level, population education would be information oriented. On the microcosmic level it will start with the family unit and proceed outwards being problem orientated and directed towards the solution of these problems on a family basis.

In the actual implementation of the subject in the school curriculum population Education " should not be a separate subject " but infused in an interdisciplinary manner into as many subjects of the curriculum as possible

For example, " in the Art classes an aesthetic of space can be related to a discussion of population density. Information concerning balanced and unbalanced human and animal populations and the ecology of population can be discussed with great relevance to biology lessons. Various mathematic concepts can be illustrated through the use of population data. In the social science subjects, the growth of the countries and the world population can be traced and the factors that affect growth discussed for their historical and comtemporary relevance.

Differences in beliefs system, whether religious, political or social can be reviewed with reference to their stands on the origins and consequences of rapid population change so that they understand the effects of these characteristics and processes on a wide range of public policies".

Thus the goal is to create an informed and enlightened citizenary capable of making responsible decisions with regard to population policy matters on an individual basis whenever possible (such as an age at marriage, needs of wife and children, socio-economic conditions etc.) or jointly as parents with regard to family size and the true values of life.

Up to a certain point the pressure of population has a stimulating effect. Beyond that point it tends to have the

opposite, a depressing effect. And so every society must find its optimum population number, if it is to function in a healthy manner. That optimum number will vary at different times and different conditions.

Population Education should be problem orientated and have an interdisciplinary approach. It should be particularly relevant to the country concerned and conditions of life existing in it.

Population Education is justifiable on strictly education grounds, whether we believe our country to be over-populated or under-populated. It is as relevant for countries that perceive a need for more, rather than for fewer people, for whatever reasons, as it is for those countries that acknowledge a population problem.

Population study involve, introducing into the school Curriculum information concerning population characteristics and the causes and consequences of population change. This implies **much more than a simple study of births, deaths, migration, and growth rates**. Among other things, it includes an attempt to develop an understanding of a wide range of social phenomena that are closely linked with and are affected by population such as Urbanization and the role and status of women. Furthermore, since all demographic processes stem from the behaviour of individuals, population study also attempts to elucidate the social and psychological basis of this behaviour.

A population education programme could discuss the advantages and disadvantages of the small family without advocating a preference, if necessary.

The Advantages of Urbanization could be explored against a backdrop of problems created by the conglomeration of people and their demands and desires. The role and status of men, women and children could be explored in order to understand the widest possible ramifications of changes in population policy, or the implementation of one.

With the teaching of formal demography pupils could be led to develop an awareness of the nature of population

growth and an understanding of why and how decisions are made which have an impact on their life later. Hopefully, this increased awareness will result in responsible behaviour in their future roles both as citizens and parents.

On the micro level the goal of population education is to develop responsible fertility behaviour as might be defined by the norms and needs of the individual's family.

Population education programmes will be considered as a curriculum enrichment programme which will involve the inclusion of population related concepts throughout the whole range of the school curriculum.[6]

The National Seminar on Population Education held at Bombay in August 1969 made the following recommendations to define the concepts:

1) "The objective of population education should be to enable the students to understand that the family size is controllable, that population limitations can facilitate the development of a higher quality of life in the nation and that a small family can contribute materially to the quality of living for the individual family.

The Seminar very clearly indicated that a comprehensive concept of population education should include knowledge about both the quantity and quality of population and the need to control them for happy human existence. "Population should not be treated merely as a quantitative phenomenon or just an essay in numbers. It is the quality of the population that is most relevant both as a factor of growth and an end product of growth and numbers have to be treated in terms of the effects they have on quality either by way of deterioration or of improvement." Population Education therefore is essentially related to human resource development. Thus population education is not only concerned with population awareness but also with developing values and attitudes so that both the quality, and the quantity are taken care of.

Studies to determine population education content.

a) Probably the greatest contribution would be a series of studies aimed at trying to understand in depth (in any given culture) why people make their demographic decisions. It is also important to see if people recognise the relationship among these various factors; and

b) The life aspirations which parents hold for their children, or which children hold for themselves, these are highly significant for moulding the content of a population education programme. A basic "message" of such a programme is that family size is related to the quality of one's life. The latter, however, is a function of factors which differ from one culture to another (these factors may also differ from one individual to another, but cultural patterns are more significant for a school programme).

The problem is one of wanted children and the answer is to encourage people to want fewer children. This is therefore a matter of public education. It would seem of greater importance (than that of doctors with their patients) to educate young people into the idea of smaller families and undoubtedly schools have an opportunity to do this. If it is part of the educational function to prepare children for life then the facts of population must take their place with the other facts of life which are thought necessary in the curriculum.

It is true that many schools already include family planning advice in their health education programmes but this tends to be directed to avoiding unwanted children. It is so easy to blame the eight-child family for population expansion and only rarely is any attention paid to the three and four-child family that is so common in developed societies and ultimately contributes much more to the growth of population.

Experimenting with different educational approaches is important. We are dealing here with the subject

which transcends formal educational boundaries yet is a matter for general educationists whose co-operation must be sought.

The formulation and implementation of a population education programme is not an easy task since serious innovations in education require supporting changes at a number of different parts and levels of the education system. An identification of at least some of these different parts will aid in understanding the recommendations which are made below.

In order for population education to be firmly established, changes at all of the following points must be made.

1) Official syllabi for courses
2) Content of approved textbooks
3) Content of certain external examinations
4) Content of work of the inspectors and supervisors
5) Pre-service education of new teachers
6) In-service education of experienced teachers,

An inter-agency group of educators, resource persons such as family planning specialists, demographers, manpower planners, and family life specialists should be included. This inter-agency group is a logical unit for planning the development of population education programmes. It may choose to develop pilot projects for a setting within which to test various procedures and instructional materials. The experience of evaluation specialists in the family planning agency may be useful at this stage.

Population education, however, is different from family planning programming and the family programme personnel need to be on guard against trying to impose their approach on the educators. Clarification of the special education goals or objectives is an important first step since the content for schools will be different at many points from that of the adult programmes.

Teacher Education

Teacher Education is a High Priority.

Population education should be part of the general education of all teachers. In addition, those teachers whose assignments may include some aspects of population education will need special instruction. Population Education has been presented here as the School's counterpart to the family population programme for adults in the reproductive ages. The potential content of such education has been identified and some of the problems to be considered in introducing the field have been noted.

In the field of population education, as in other areas of education, an evaluation of the consequences of education for adult behaviour and attitudes is not easy to make. However, the population problem is a serious one and under the best of circumstances the changes needed will require a number of years. With an effective educational programme the process of change could be facilitated.[9]

The following guidelines should be borne in mind while planning or designing a population education programme.

1) The content and instructional methods used should be pedagogically sound.
2) The responsibility of the introduction of population education into the formal education system rests with the educators.
3) Population education should be integrated into the curriculum rather than added as a new subject.
4) The content of population education must be worked out in detail by education specialists in each country.
5) The content of population education should be developed with full appreciation of related education and action programme adressed to adults.

6) Realistic goals for population education should be formulated.

7) A long-range strategy for introducing population education should be formulated.

8) Family planning leaders have important functions to play as stimulators, resource personnel, critics, and supporters.

9) High priority should be given to Universities and professional Schools as centres for the general education of leaders, the preparation of professional personnel and the development of basic knowledge on which policies and programmes may be built.[10]

FAMILY LIFE EDUCATION

The Goal of Family Life Education

Family Life Education is the microcosmic approach of the educationist towards the solution of the population problem of the nation and the world by the family unit. It is for the benefit and welfare of the family that population control is sought.

It focusses on the "*quality*" desired for the family, rather than on the macrocosmic considerations of over population on land, food and resources.

The quality of life would depend on conceptualizing the human need structure in a new perspective and on making adequate provision for it. It is difficult to offer an inventory of needs that would respond adequately to diverse cultural demands and aspiration levels ; it is essential to achieve a measure of consensus in regard to them. In any event, the need structure will include :

1. **Survival needs** : with provisions for food, shelter, gainful employment, preventive and curative medicine and protection of life and property.

2. **Societal needs** : involving promotion of community-ness and social cohesion ; section of effective conflict-resolving and consensus building mechanisms ; and evolving and enforcing norms of social discipline.
3. **Welfare needs** : including measures that offer a fair deal to the weak, the disabled, the handicapped and the vulnerable.
4. **Psychic and cultural needs** : including provisions for personal freedom and privacy ; leisure and its creative utilization; and equal opportunity for advancement and general development.
5. **Adaptive needs** : requiring mechanisms for scanning the social, cultural, psychological and physical environments as well as for identifying and effecting modifications necessitated by changes in these environments.
6. **Progress needs** : involving sharpening of problem anticipating and problem solving capabilities : growth of scientific and technological research : and development of human engineering skills.

A decision to marry and have chidren is a serious one for the couple themselves and for the child and should therefore be made responsibly and with full knowledge of its consequences for themselves and for the country.

Good parents are likely to have children who will make good parents themselves and yet this needs training or education from the beginning.

The development of a responsible attitude towards family strength, integrity and size are important and must be developed.

It is often said that our present educational system equips our youth in all but the most important (from several points of view) role that he/she has to play in all likelihood and that is to be parents.

The training of youth to be effective and successful parents and good family members is called Family Life

Education. This has been defined and explained in different terms :

Kilander states that Family Life Education stands for the protection, preservation, extension, improvement and development of monogamic family based on accepted ethical ideals.

In the Human Life Cycle (as represented here diagramatically) adequate support must be given at the critical periods of Transitional Events – ranging from conception to death: this support is given in the from of physical, emotional, and spiritual aid and will vary in extent and depth. However, no individual should be unprepared for these crises in his life.

Family Life Education includes all educational measures which in any way help young people to prepare to meet the problems of life that have their centre in the sex instinct, and inevitably come in some form into the experience of every normal human being. These problems extend over a vast range of life's experiences from simple little matters of personal sex health to the exceedingly complicated physical, social, psychical and moral problems that concern successful marriage and family relationship.

Another definition can be that Family Life Education refers to the broad programme in home and family living designed to impart knowledge regarding practices, values and attitudes affecting family relationships.

The ad-hoc working group on Family Life Education of the International Planned Parenthood Federation which met in Tunisia in November 1969 discussed the definition of Family Life Education. This group felt that to each of such phrases as 'family life education', 'sex education', and 'preparation for family life' there can be objections depending on the cultural setting in which they are used.

In some countries, information on planned parenthood can only be introduced in courses described as

'Family Life Education', yet in others it is easier to discuss human reproduction where family planning programmes have been established. In one country it is necessary to avoid references to the word 'sex' if the programmes are to be introduced; in another, to omit the phrase 'sex education' would merely be to mislead people; in a third, care has to be taken to avoid phrases implying that methods of contraception are being explained, even if they are. Inspite of these difficulties, the group unanimously adopted the phrase 'Responsible Parenthood and Sex Education' to describe the area of Family Life Education.

The body of knowledge included within the compendious term 'family life education' has grown in a pragmatic way, depending upon the social and other pressures of the times, the places where it has developed and the viewpoints of those who perceived the needs and tried to meet them. This has happened gradually and unevenly over a long period of time, in different parts of Europe and North America, but as far as Asia is concerned, such teaching in an organised manner hardly exists at all. In India, while over the years family life and sex education projects have been conducted here and there, recently a new wave of interest has arisen in connection with the possibilities inherent in a programme of population education.

The Human Life Cycle

Family Life Education is concerned primarily with an individual's personal life, personal growth, sexual development, inter-relationships and adjustment to society. Thus population education is not the same thing as family life education, since each has a different focus. It is possible for family life education to proceed without any reference to population dynamics.

However, it is obvious that population education and family life education would converge and interlock at certain points, especially in connection with the biological, physiological and psychological aspects. The ideal situation would be to develop and integrate both into a comprehensive plan of education.

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Family life education in other countries

In many parts of the world, there has been increasing interest in programmes of family life education, and more recently of population education. However, several countries had earlier felt the need for conducting family life education or sex education programmes for their young people. These programmes were based on the varying needs of the countries concerned.

For instance, the Swedish Association for Sex Education (RFSU) founded in 1934 has always stressed the need for sex education as an essential part of a contraceptive service. In 1956, the Swedish Parliament made sex education compulsory in schools. In view of the attitudes and behaviour of Swedish youth and of the influence of easily available printed materials and mass media, the need for more sophisticated programmes and for careful preparation of the teachers was recognised.

In Denmark, the need for sex education emerged because of parental fears about the spread of venereal disease among young people, rising rates of illegitimate births and the availability of reliable contraceptives.

In the United Kingdom, while there is a general agreement that sex education and family life education must have a formal place in the school curriculum, there is difference of opinion as to the age at which this education should be given, who should give it and what topics should be covered. At the governmental level, from as early as 1943, several reports and pamphlets have been produced indicating the urgent need for such programmes and how they should be carried out. Schools are encouraged to incorporate sex education into the normal curriculum and to take help of such agencies as the National Marriage Guidance Council, The National Childbirth Trust and the Family Planning Association. In recent years, radio and television programmes have been devoted to sex education for use in school as well as for the general public.

While there is a great deal of interest in sex education and family life education in the USA, these subjects are

not yet institutionalized in the education system but several states and local governments have introduced the programme in their schools and various unofficial agencies such as the Planned Parenthood Federation, the Sex Information and Educational Council of the United States (SICUS), several colleges and religious organisations are conducting programmes in family life education and sex education. Many universities now offer special training programmes in such fields as sex education marriage counselling and family life education.

A notable feature of the Family Life Education programme in most countries is the fact that surveys carried out in the various groups have repeatedly indicated the increasing demand from the young people themselves as well as from the parents for programmes of sex education and family life education.

Family Life Education and Population Education in India :

The Association for Moral and Social Hygiene which is an organisation affiliated to the International Abolitionist Federation approached the subject of sex education from a prophylactic point of view. It started a counselling centre at the University of Delhi where students could bring their personal problems. Talks on family life and sex education were given to students of different colleges. In 1964, the Association started the Family Life Institute in Delhi which offers free and expert advice on behavioural problems in children and personal, emotional, marital, sexual and other adjustment problems in the family context.

The Family Planning Training and Research Centre in Bombay has conducted family life education programmes in schools since 1958. It also arranges for training courses for teachers, doctors, social workers and other volunteers who would like to take up this programme.

Several Catholic institutions have given their attention to this subject over a number of years and some of the teachers in schools and colleges have tackled these subjects in the

The Human Life Cycle

(W.H.O. T. R. S. No. 485)

Phase of Development	**Transitional Events Requiring Preparation For, and Guidance**
Pre-conception	
	Conception
Fetal Life	
	Birth
Breast dependence	
	Weaning
Pre-school age	
	School entrance or equivalent
School age	
	Puberty
Adolescence	
	Attainment of Maturity
Age of production and reproduction	
	Climacteric
Senescence	
	Death

higher classes. The Indian Social Institute has set up a Family Life Centre at New Delhi which conducts marriage guidance and parent education programmes, assists in establishing family life education programmes in schools and colleges, and publishes books and pamphlets on these subjects.

In Universities where Departments of Home Science exist, there are courses in family living, child welfare and related topics. A few schools and colleges in different parts of the country have also instituted courses in family life education. Several small agencies scattered in various places are attempting to provide some guidance and counselling to clients in family and marriage problems.[2]

The Family Welfare Centre at Bangalore, which has been actively engaged in this field through comprehensive Parent Education Programmes and regular courses at schools and colleges, is about to publish a booklet which will be of great aid to teachers in evolving lesson plans in these subjects, so that Family Life Education becomes an integral part of the general education. It also offers special Marriage Preparation programmes, besides well organised Family Planning services through centres and extension work.

There is also a growing awareness in India that more attention needs to be paid to the aspect of " quality of family life ", so that with a small family, parents are able to devote even more time and attention to their children.

Moreover, with greater numbers of nuclear type families, parents and children come closer together, Too often, this " closeness " is not exploited or utilised to benefit either parent or child, and the latter is deprived as a result.

Programmes of Family Life and Population Education are becoming known in the country : schools and colleges are introducing and integrating these courses into their curriculum.

In concluding, may I say that a decision to practice Family Planning is not taken lightly in India. Intrusion into this aspect of marriage is often resented by couples but as Robert McNamara in his article "Over-population: A Tangled Problem" says, "Family Planning is not designed to destroy families. On the contrary, it is designed to save them." — save them to benefit from a better quality of life.

All of us accept the principle that in a free society, the parents themselves must ultimately decide the size of their own family. We would regard it as an intolerable intrusion of the family's rights for the State to use coercive measures to implement population policy. We can preserve that right best by assisting families to understand how they can make that decision for themselves.

If we are to keep the right of decision in the hands of the family – where it clearly belongs – then we must give the family the knowledge and assistance it requires to exercise that right.

In upholding this view, I believe that education holds the key to the population problem. It can open the door to a new and enlightened vista where couples will use family planning to benefit themselves as a family, the basic unit of society and the nation at large.

HEALTH EDUCATION FOR FAMILY PLANNING

Health Education may be described as the "translation of what is known about Health into desirable patterns of behaviour for the individual and the community."

The Scope And Technique Of Health Education

Health education aims to change the habits and attitudes of persons in order that they may practice healthful ways of living in their everyday life, whenever such a change would be beneficial to the persons themselves and to the family or community they live in.

Probably the most important field for Health Education in India and other developing countries is in the area of population control. For adults, this is concerned chiefly with Family Planning methods (for spacing and limitation of children) and other " non-medical " methods which directly influence family size like raising the age at marriage.

The chief aim of Health Education with regard to Family Planning is to impress upon the individuals, the married couples and the community as a whole, the positive values of a small family size, so that their way of living would be oriented and directed towards the attainment and maintenance of such a family. The decision to do this (have a small size family) would be chiefly as a result of a "change" or education affected in the family.

Explaining the use and meaning of certain terms Bannerman says, "**Family Planning**" is a vague term and misunderstandings have arisen among health professionals, administrators, and clients regarding the type of activities that could be undertaken under this banner. The objectives of Family Planning include the reduction of maternal and child mortality and morbidity, prevention of abortions, the promotion of family health and welfare by methods including health education.

Operationally, Family Planning, in broad terms involves the provision of integrated health and educational services which will give opportunities, wherever possible, for a multidisciplinary approach to the health problems of the family within the context of each community. Closely related areas include general education, medical, nursing and midwifery education and training, and the health education of the public for family life and responsible parenthood.

Education is a generic term and involves providing knowledge, skill, competence, or usually desirable qualities of behaviour or character especially by a formal course of study, instruction or training. It is a conditioning, strengthening or disciplining especially of the mind, and enables the individual to acquire attitudes, develop skills and change behaviour.

Training by definition means to instruct, inculcate habits of thought or action, in order to attain a skill. It is the term used to describe the experiences designed to influence the trainee's knowledge, attitudes and behaviour in order to facilitate the attainment of the programme's objectives. There is no fundamental difference between education and training. However in training, the training is more restricted and specific, the

duration more limited, the aim often being the acquisition of certain skills or techniques required for the performance of specific tasks,

Communication refers to the transmission of information and ideas from one individual or group to another. The process includes verbal or non-verbal messages, transmitted through one or more channels from the message senders to the receivers who in turn may provide feed-back to the senders. It is through this process that true communication of ideas, understanding and ultimately the decision to act are accomplished. Communication is a component of all educational and training processes and the final goal is to produce desired change in knowledge, understanding, performance and behaviour patterns.

Motivation refers to the inner needs or drives which influence how an individual learns and behaves in relation to his aspirations, goals or purposes in life. The motivation of individuals is of great importance in the development of all programmes designed to effect social and behavioural change.

Education in Family Planning, like medical education, is becoming increasingly a life–time study, and the health worker owes it to the community to become technically competent in his field and to remain so.

The end result of education necessitates a whole change of attitude in the persons being educated. This change is from 'negative' to a 'positive' attitude. Success of policies whether economic, political, social or health, depend upon the volition of the people, which results from their consciousness. This consiousness can be positive or negative as shown in Table 1. This represents, according to Professor Moreimon Ito, the Indian situation that is common to other developing countries in Asia.

Attitude Change as a Result of Education

An attitude is a mental and neural state of readiness organized through experience exerting a directive or dynamic influence on the individual's responses to all subjects.

Where a negative attitude exists, a change to a positive one is indicated.

TABLE 1

	Negative	*Positive*
1.	Dependence Consciousness	Independence Consciousness
2.	Indifference	Participation
3.	Inferiority Complex	Superiority Complex
4.	Close-Mindedness	Open-Mindedness

Principles and Practice of Health Education

Since Health Education involves "change from one attitude or state of mind, to another, a full understanding of the people's behaviour, which springs from their beliefs; their misconceptions, prejudices, and age-old traditions and customs, is necessary on the part of the educator.

Health Education brings together the art of science and medicine, and the principles and the practices of general education. The link is to be found in the social and behavioural sciences – sociology, psychology and social anthropology.

Health Education cannot be 'given' to one person by another. It involves, among other things, the teaching, learning and inculcation of habits concerned with the objective of healthful living. Psychologists have given a great deal of attention to the learning process. Every individual learns and through learning develops the modes of behaviour by which he lives.

Learning and teaching is a two-way process of transactions in human relations between teacher and the taught. The teacher cannot teach unless the pupil wants to learn. [3]

There are different types of learning to achieve education :

1. Habitual learning
2. Imitation learning

3. Trial and error learning
4. Curiosity learning
5. Incentive – Rewards and punishments learning
6. Motivational learning
7. Reinforcement learning

and more than one or two combinations are necessary to get the desired effect. Teaching does not guarantee learning. Even the best of teaching cannot guarantee learning.

Learning is change in < Attitude and Behaviour

1. No learning takes place unless there is actual interest on the art of the learner. Learning – an enquiry – can be exciting.
2. No learning takes place unless certain formulations are made landmarks on important points very clearly.
3. No learning takes place unless it is with formulations of aims, and objectives are made – ie. even if patches of education – which must direct towards the end
4. No learning takes place without Activity – it helps Communication.

   Talking and looking at things.
   Role playing and simulations

5. No learning takes place unless it is lifelong. The tendency is that the moment the college courses finish, the learning finishes:

Health Education should not seek to judge; order/or direct change.

Health Education should assist, suggest and guide.

Health Education must be total. It should not place one problem with another, even when ins it cannot always provide a solution.

Education can be persuasive. Persuasion is an attempt to manipulate an individual's thinking.

"Success of Family Planning Programmes appear to be dependent on the conversion of large family size from the marginal utility it is to the vital concern it should be. Such conversion, however, is impossible because of political, social, economic and humanitarian considerations. An alternative approach is to stress the instrumentality of birth control in connection with existing goals and values of the target population – goals and values that are already vital concerns."

The education approach to Family Planning is a major means of achieving a democratic solution to the population explosion. Though slow, its results are more likely to be permanent and enduring.

In an area as sacred and often fraught with suspicion and anxiety, it is essential that the whole process of Education in Family Planning be carefully and harmoniously developed. Confidence in, and acceptance of, new ideas, often revolutionary in an orthodox society, can only be attained if due consideration is given to existing social and religious codes.

Instead of totally avoiding delicate religious issues or objections concerned with Family Planning, Health Education should stress on the idea that it is the 'quality of life' – an idea that all religions advocate – that should motivate parents while planning their families. For a family even while directing itself to "quantity", ie. restrictions of family size, should also be equally concerned with the positive and true qualities of living.

Family Planning should be a way of life. The target groups are men as well as women, the poor as well as the rich; senior citizens where they legitimize social change as well as the young. It should never be forgotten that the capacity to reproduce comes with the threshold of adulthood. The earlier in life we get our message across, the longer the impact within the women's limited period of fertility and the greater the impact on the periods of man's greatest potency.

Hence the need to infiltrate our message into every social group – working groups and trade-union groups ; educational and social groups ; men's and women's groups and grand-parent groups. The message should be built into community development programmes, nutrition programmes and agricultural programmes. [5]

With nearly 25 years of Family Planning experience behind it, the Government of India, which was the first Government in the world to make Family Planning a national policy creating a separate ministry at central and state levels to propagate and direct it, learnt several lessons to its chagrin. Not the least of these was the adequate and appropriate Health Education planning in an absolute prerequisite for Family Planning acceptance and the idea of small family norm.

The whole programme of Health Education must be carefully pre-tested and the existing state used as an infrastructure on which to build up the superstructure of a Family Planning and welfare programme. Health Education is chiefly a problem of establishing rapport or communication between the educator and the educated.

Enthusiastic Family Planning workers often inflicted Family Planning when it should rather have been sought as a natural corollary to a better appreciation and attainment of healthy family living. In a communications Research Project in Iran the report[6] states that "for achieving maximum impact, the scheme should proceed in three stages.

> **First**, different groups in the population should be studied to determine the degree of interest in Family Planning, and these groups should be ranked accordingly as potential target audiences." (In India this would comprise the 90-100 million " Target Couples" — i.e., couples in their reproductive period and approximately 97 million school-going youth).
>
> **Second**, this preliminary information should be used to develop a communications strategy that will reach the

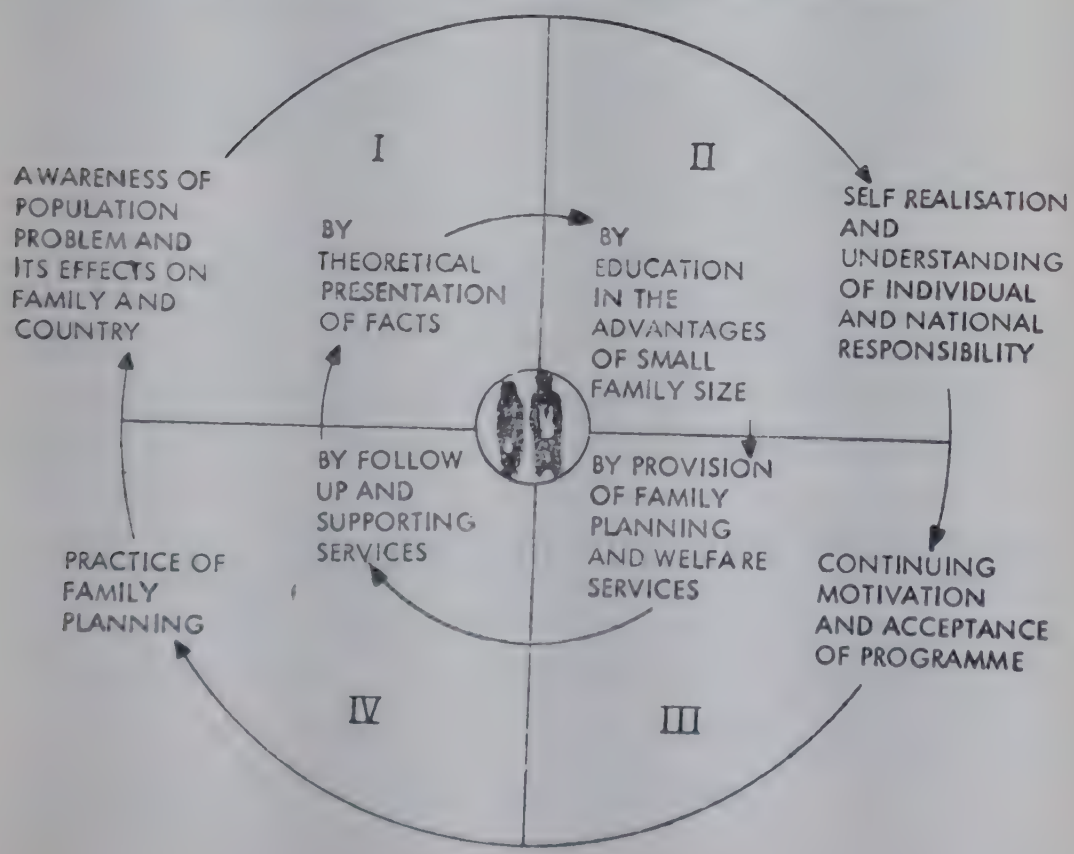
various segments of the population with an appropriate appeal. In this stage of designing appropriate strategies, techniques of pre-testing and evaluating the effectiveness of materials and messages will be of primary importance.

The **third** and final stage of such a project consists of the co-ordinated application of the various communication methods so that they will be mutually reinforcing. We may say that this stage is in effect a total effort."

The Diagram below represents the cycle of Health Education which lays stress on the gradual transformation of the mind or attitude from the presentation of theoretical problems of over-population into finally, the active practice of Family Planning. In other words, to achieve what the mind, having been educated or changed, now seeks to have the body do, i.e. to achieve a small family size.

TABLE II

THE CYCLE OF HEALTH EDUCATION FOR FAMILY PLANNING


I
II
III
IV
AWARENESS OF POPULATION PROBLEM AND ITS EFFECTS ON FAMILY AND COUNTRY
BY THEORETICAL PRESENTATION OF FACTS
BY EDUCATION IN THE ADVANTAGES OF SMALL FAMILY SIZE
SELF REALISATION AND UNDERSTANDING OF INDIVIDUAL AND NATIONAL RESPONSIBILITY
BY FOLLOW UP AND SUPPORTING SERVICES
BY PROVISION OF FAMILY PLANNING AND WELFARE SERVICES
PRACTICE OF FAMILY PLANNING
CONTINUING MOTIVATION AND ACCEPTANCE OF PROGRAMME

In India, increasing attention is being paid to educating not only the "target couples" but also the premarital group who plan to get married in the near or remote future, in the principles and practices of Responsible Parenthood.

Other important groups who create or influence public opinion should also be brought into the Health Education programme wherever feasible, i.e. professional people like doctors, midwives, nurses, lawyers and politicians who may assist through their own specialities and act in liason whenever needed. For example, in legislation to raise and enforce the age at marriage (at present 15 and 18 years for girls and boys in India, and sought to be raised to 18 and 21 years respectively).

Also, religious leaders and teachers, i.e. people who are trusted and consulted by parents and individuals in times of difficulty or trouble, and to whom no "financial gain" or ulterior motive can be attributed. This is particularly important in India.

Health Education for Family Planning needs a co-ordinated effort. Voluntary agencies with health or medical institutions, need to be adequately linked up with the various Government ministries of Health and Welfare, Information and Broadcasting, Youth and Education, Culture and Social Affairs and Industry ; into a network of services.

"The emphasis upon integration is by no means confined to the communication sphere ; it is increasingly stressed in all development programmes where the interests and disciplines of separate Ministries, separate agencies, have in the past created a pattern of confusion. There is little point in stressing population control if it is not linked to agricultural improvement, economic development, health and welfare. There is a demonstrable unity in all of these activities, but the villager is unlikely to have the sophistication to perceive it without help. In his terms, economic development means that he will have the capacity to feed more children, not to restrict family size."[7]

Health Training Centres have a major role to play in the education and training of health personnel for Family

Planning activities. The health problems of people are to an important extent related to large family size and the medical approach is therefore an important part of the total approach to making a small family size attractive.

The schools of medicine, nursing and midwifery must therefore take professional leadership for educational service and research programmes in family planning and in full collaboration with the ministry of health.

A core of educators should be created in each country or groups of neighbouring countries. The objectives of the training programme should be clearly stated, due regard being given to the local situation including social, cultural and economic factors. Short-term training programmes should be instituted to provide orientation, in-service training and refresher courses for all those involved in maternal and child health work and family planning activities.

Educators should be acquainted with the newer teaching methods including the development and use of audio-visual aids. Nurses, midwives and their auxiliaries, including dais or the village midwives, have an important role in family planning programmes and are particularly effective in the health education of the public.

Constant evaluation should be undertaken and based on the clearly formulated objectives, and in terms of quality of service offered to clients. An effective feedback is essential, and it is important to maintain a continuous flow of information between administrators, planners, educators and teachers, the health team implementing the programme, and the clients or community.

Teamwork is an essential function. Duplication of work should be avoided from the time and expense point of view, but reinforcement of motivation is necessary at all times and at different levels.

A multi-cultural approach need to be developed to create an "optimum emotional environment". As Doctors, we must strive to be more humane in our approach and remember

the "Family" in our Family Planning Programmes, and not succumb to the temptation of the mere technicalities of the programme.

Workers in, and sponsors of Family Planning Programmes are now acutely aware that when a family has limited their children, these children must be cared for in a comprehensive manner and that they must be protected against infection and malnutrition and so grow to achieve adulthood (Child Wastage Index is 40 in India, compared to 4 in Japan). The Maharashtra State (India) Government has already renamed, and enlarged the scope of its Family Planning Services, as " Family Planning and Welfare Programme."

In an interesting and unique integrated health scheme in a village outside Hyderabad (India) the doctors waited for parents of healthy children to come forward and request that Family Planning Services be provided for them.

These parents had seen that their children had survived infancy by proper immunisation and health care and would now grow into adulthood. They realised that to add to their families now, would threaten the present and future well-being of their living, healthy, and growing children. No incentive or compulsion was needed. Instead, a request or need for Family Planning was born out of a genuine desire to give of their best to their children. Such a situation is of course ideal.

PART IV

POPULATION AND THE FAMILY

THE FAMILY IN INDIA

"Family life not only educates in general but its quality ultimately determines the individual's capacity to love. The institution of the family is decisive in determining not only if a person has the capacity to love another individual but in the larger social scene whether he is capable of loving his fellow man collectively. The whole of society rests on this foundation for stability, understanding and social peace".

— MARTIN LUTHER KING

In India, today we are very fortunate that there still exists to a great extent the reverence and affection for the 'family' as a vital institution.

The term 'family' is used here in accord with Irene Tauber's definition :.....'Those related persons who live together within a household, usually with common eating as a criterion of co-living.'

India has an ancient heritage of family life, stable in structure and spirit. Writings in the Rig Veda and the

Laws of Manu devoted great attention to family life and family inter-relationships.

It was recognised and expounded that children grew best in an atmosphere of security and affection and that material attributes can never be substituted for true love. Love was caring, sharing, needing and giving ; and it is only within the many relationships that family life so abundantly provides that the child, as also its parents, can individually and together develop into mature persons.

When we refer to the Indian family it includes families who are vastly different to each other as regards religion, culture, temperament and way of life. There are the Hindus who form the majority and have been living in the country for over 2000 years. There are the Muslims who came later ; the Christians (the Syrian Christians who came in the first centuries ; those converted by St. Thomas ; and still later those converted by St. Francis Xavier and other missionaries) the Sikhs, Buddhists, Parsees and Jains. In each case the family pattern varies. Superimposed on this is the silent social transformation taking place in the Indian family. This is due largely to the process of modernisation bringing with it a breaking away from accepted family traditions and family controls and increasing opportunities for social mobility.

'There is a shift from the sacred family centred on moral and religious values, to the secular family with its more rational and pragmatic philosophy which leads to family members adapting new goals for themselves and the community'.[1]

The average family in India today is experiencing the influence of four fundamental social phenomena:

a) Transition from rural society to urban society.

b) The process of development bringing with it greater wealth for some families, insecurity for others, and social fringe-living for the remainder.

c) The rapid growth in population creating a number of problems of socio-economic and ethico-religious character.

d) The socialization process which is depriving the family of some aspects of its social importance and of its spheres

of influence, but which leaves intact its essential values and its conditions as the basic institution of society as a whole.

Family Patterns

Thus in India we now find four types of family structures :

1. The large joint family
2. The small joint family
3. The simple nuclear family
4. The stem or extended family.

The Large Joint Family :

"In structure it comprises a married man, his father, his grandfather and his collaterals within three generations. The different kinsmen along with their spouses and children occupy the same dwelling, eat and worship together, and enjoy property in common. They co-operate in economic activity, and even if the members are differently occupied, pool their earnings. The joint family provides nursing care for the sick and afflicted, social security for the unemployed, and support for the aged. The care and maintenance of dependants is a moral obligation, and is backed by the forces of social prestige and opprobrium. The members of this unit are closely knit together. They share the various routines, problems and joys of social living, have strong, feelings of mutual obligation during crisis, and regard self-interest as being identical with family welfare.

Although this classical picture of the joint family is presented as the major form of family structure in India, there is a lack of statistical evidence of its prevalence in the general population There is a definite decline due to modernisation and legislation pertaining to the status of women and property inheritance.

However, it is found that the joint-family is more frequently found among Hindus, than amongst other communities; in agriculturalists rather than traders clerical and professional workers. It is more frequently found in the lowest income group and the least frequent or prevalent in the highest income group.

When economic status is measured by the number of acres of land owned, one finds that the joint familiy is the most frequent among persons of medium status.

The prevalence of joint-family among couples differentiated by the educational level of the male shows a negative association between joint-family living and the level of education. The percentage having this arrangement is 36.3 for illiterates, 30.8 for primary educates, 30.5 for middle educates, 19.8 for nonmatriculates, 14.3 for matriculates, and 9.2 for college educated."

The Small Joint-family is composed of a household in which parents live with their married sons and other unmarried children or two brothers live together with their wives and children.

The Simple Nuclear Family: according to the urban Western pattern is increasingly found in the urban areas in India. Here parents live with their unmarried children. A married offspring finds a new home and lives away from his parents and his brothers and sisters.

The Stem or Extended Family: Where the nuclear family lives with one or both grandparents or an aunt or uncle. This arrangement is suitable for a working wife or mother and where domestic help is scarce. However, even where the traditional joint family no longer exists physically, we find that the mentality of the joint-family persists, for even in urban areas where the family is separated the contact and family ties are preserved to a surprising extent.

There were 3 types of family systems in India, the Maternal type called **Matriarchal** system, where descent is traced through the mother, and children are raised in the home of wife's relatives and the husband has a secondary position in the home of his wife and children, and authority within the family group belongs not to the husband but to some representative of the wife's kin. This pattern is uncommon and exists among the Nairs of Malabar and the Khassis of Assam.

The more universal type of family system in India is of the 'Patriarchal type' which in its extreme form vests

all authority with the head of the household, the father. In the bilateral system, the emphasis is about equal for both father and mother line.

The traditional joint-family functioned as a kind of clan and a distinctive feature of this family cohesion was the certainty with which any family member could count on a solidarity or support in any situation of need. The fact that one belonged to a particular family was also likely to open doors, facilitate business and give automatic recognition within a considerable social sphere. "Kin-groups represent, so to speak, the individual's second line of defence." When the individual is not able to obtain assistance from the most immediate members of his family, he can, in most societies, turn to his other relatives and receive the assistance that he needs.

The family is a basic unit of society. It serves important functions and forms important relationships with the larger society. Some of the functions are ;-

1. **Biological** "The family is regarded as one legitimate unit for reproducing and nourishing new members.
2. **Socialization** The family is normally the primary agent for the training of the child in the values, norms, expectations, and patterns of behaviour in the society. Sometimes this training also includes the imparting of specific occupational skills.
3. **Status Placement** The place of the child in the society's stratification system is at least initially derived from the family. Even in societies where the rate of social mobility is high, initial placement has great influence on the future status that an individual may acquire.
4. **Emotional Maintenance** This function has to do with providing the individual member with the security that he/she needs psychologically.
5. The family is the transmitter of SPIRITUAL and CULTURAL Values

In the past, but to a lesser extent now, the family prepared one son for dedication to the religious life. This was common to most religious communities, and society was morally

enriched in many ways. In its turn, Society exerted profound influence on the family through its many institutions. Also, through its legislation on divorce and child labour which affect both the structure and the functions of the family.

Educational Institutions in many countries have taken over a significant part of the child's socialization and training.

Family Planning programmes utilise a variety of institutions – political, educational and medical, to influence the way families discharge their function of biological reproduction and maintenance.

The work of social welfare agencies among certain types of families in a society may likewise be viewed as part of the society's attempt to influence the way these families organise themselves and discharge their functions.

Moreover, the economic function of simple and peasant societies become less important as modern technology renders the labour of the family as a unit superfluous if not inefficient. Other functions such as socialization are diminished as nursery and other types of child-training schools are established. Family members also find that other needs, such as that for education and recreation, can be at least partially satisfied outside the family. The traditional authority of parents and elders is being eroded, and new norms of authority are more likely to be permissive than obligatory. This, and the likelihood that children's training outside the home will include knowledge and skills unknown to the parent are significant factors that contribute to the present tension, in the average Indian family, between parents and children.

The family thus caught in the process where society-wide changes are forcing a re-evaluation of its functions ; a re-structuring of its relationships ; and a re-definition of its norms, will manifest considerable strains and stresses. One must assist such families to readjust to change before the tensions become so severe as to induce disorganisation.[4]

Family patterns are emerging at a confusing rate of change. One important change that has affected family life in

India is the breaking up of the joint family system. In the new family pattern both parents work and go their way; children go their own way. Often working parents have little time to spend together as a family ; and the adolescent pulsating with new energy and full of new experiences and buestions begins to get estranged from his part-time parents. He is now deprived of imbibing the culture and traditional values which he formerly did through the grandparents, and full-time mothers and aunts in the joint family situation. He has time on his hands which he spends with his peers or in spurious pursuits. Radio, movies, cheap literature and other media of communication retard his moral growth, transmit shallow short-lived goals and estrange him from the older generation.

Misunderstanding between the generations is heightening tensions in the family ; and yet in India we have neglected the importance of social investment in building well adjusted happy homes. This is all the more regrettable when in Indian society, the family is still a more magnificent unit than the individual, and individual family members find it difficult to visualise themselves as separate from or fully distinct within the family.

The family is being exposed to ideas which have directly influenced changes in family patterns and practices. Some are due to education directly, or to more remote influences. Among them are :—

(a) A new respect for the maximum development of every individual person, as compared to the unit of the family

(b) **The Concept of "Romantic Love"**. Certain aspects of the traditional types of marriage and family patterns in India are incompatible with it. However now one often finds what is referred to as the "arranged love marriage", where the girl and boy meet and like each other and the parents arrange the marriage according to the traditional custom. Boys and girls now meet in school, college or at work, and with the greater social freedom afforded, make their own choice of marriage partner. However, since the family and community patterns of social and religious life still persist, the youth are more likely to

meet others from the same socio-religious background. Such "arranged love marriages"are becoming increasingly more common and are to be encouraged as they are a healthy compromise between the traditional and modern, and tend to preserve the qualities which contribute to a happy marriage.

(c) **The Process of Secularisation**. For individuals this involves giving up a group of ideas expressing the traditional, religious and classical culture and taking up another group of ideas expressing a basic world view.

(d) The related pragmatic belief that there are great utilitarian values to be found in what is called "western civilisation" Unfortunately Indian youth usually associate modernisation with Westernisation and prefer to give up good practices or acquire harmful ones simply because doing so would be modern and therefore good.

The caste structure of Indian society is also changing and this is reflected in the increased number of inter-caste marriages taking place. These marriages are more subject to stress and strain as an important factor which otherwise eased the adjustment of newly-weds, was the fact that both partners came from the same caste and had the same social customs and practices. Such marriages need help from their families and social agencies.

Moreover, in the joint family always an exciting group to live in, there is always something of interest happening. It is a miniature world where all the events of life can be experienced or seen—Births, deaths, marriages, religious and social functions.

The state of transition in which the Indian family increasingly finds itself placed in is one which lies "between the community-type society, and the association type society. The former is conservative and hierarchical, a man has his kin or neighbours; he is assured of stability and is sustained by the warmth of fraternity. In the association-type society there is more liberty and more equality but the fraternity is gone, and so is the stability. Now, the rate of social change is such that one

grows old in a different world from that in which one grew up. But fast as it is, the rate of social change is still not fast enough to provide in time the adjustment that this change requires. He is like a man whose legs cannot keep up with his centre of gravity racing down a mountain side.

"The transformation of the family as a social cell to the idea of the family as a harmonious group of affective relationships is gradually taking place."

The family presents a domestic drama which begins with the welding together of the universes. Two people try to see how they can inhabit one universe. Their roles are not much affected by any particular purpose. They are not out to achieve anything consciously, except to make something of their lives together. In the technical language of social science we say that their aims are expressive not instrumental. Now here we have what happens to be the maximum room for the free play of persons. They can live together in mutual fantasy or share a world of dreams. But in fact this world of dreams is already structured for them. The notion that their dream worlds should be the basis of a common life together for a prolonged period in which children become a responsibility of them both, is a general cultural expectation. It is what we call a cultural pattern which provides a model for behaviour, a sequence of moves which is strictly governed.

And if the two people who are partners in the relationship of marriage have an idea of the basic moves to be made, they can communicate with each other. A game in which there are no rules makes sharing impossible.

As the relationship develops the two people involved can use the rules more creatively It becomes a rule that they are allowed to dispense with some of the rules. But as they do so, the protecting function of rules and conventions is reduced and each partner becomes more vulnerable. Freedom exacts a price in vulnerability. But as the rules of the preliminary engagement are put aside, freedom is constrained within another chapter. This is a world of models of the other person, a stage which is full of revolving and receiving mirrors.

So we are not in a world of pure persons but in a world where people are seeing each other as reflections of themselves, and of other people particularly those people who provided them with their first models for the role of husband and wife. Indeed a man loving a woman sets her against several models superimposed one on another; the cultural ideal, the actual cultural expectation (less than the ideal), the way his mother played her part in relation to her husband, and the way she played her part to him.

And then there are the standards of wifely beauty, bearing and behaviour, expected by those who are his friends and peers. One might say that he loved whatever shaped up to these expectations as much as choosing the loved one and measuring her against what he expected. So not even love is totally free, not even sexuality is naked.

The inter-relationships that exist in marriage and family life are not only complex, but continually changing and developing as the indivituals mature and develop. The helpless infant growing into defiant adolescence, and then into independent adult demands an understanding that parents are often unprepared for.

Family services, whether they be welfare, educational or counselling, must be " aimed at enabling and facilitating the family members to participate in the social and economic life of the country and to contribute their share to national development."

The full spiritual values of family living will be realised only if we apply the ethics and spirit of the family to-business and social relationships both in immediate and international circus. Erich Fromm* calls for a mass movement from the family outward, designed to help individuals to move towards a personal transformation from an alienated person into one of active participation.

As families learn to cope with their life situations and develop their own resources they will have the opportu-

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* A well known Psychiatrist.

nities they need for growth and fulfilment. By family development through an integrated programme of family life, education and family welfare services families can learn to stand on their own feet, have the strength to meet their needs in these changing times and gradually assume responsibility for the transformation of society.

Parents must be able to bridge the gap either educational or cultural between themselves and their children. They need supportive services and preparation for this, but once done or provided, such help pays rich dividends in the formation of heal the relationships between parents and children and between them and society at large.[10]

Fortunately, divorce is still comparatively rare in India, but where one-parent families exist (in the case of death, divorce or separation) few supportive services exist. It is in such situations that the advantage of a joint family mentality which prevails in urban societies (even when the joint family no longer exists physically), is seen.

The children of one-parent families face great disadvantages in any society and more so when the parent is unable to function effectively. Divorce is considered only in extreme cases. Separation is more often sought for few would like the stigma of divorce. Remarriage is not very common as adultery is not a common ground for separation. However, modernization can change this if precautionary measures are not taken.

The Role of Women

"I am proud of the woman of India. I am proud of her beauty, grace, charm, modesty, intelligence and spirit of sacrifice, and I think if anybody can truly represent the spirit of India, the women can do it, not the men."

J. Nehru

From the point of view of the demographer as well as the social scientist, looking to the role of women in relationship to fertility and the family a great deal of interest has been expressed. More especially, humanistists and policy-makers

concerned with reducing fertility have studied the changing status of women and its effects or impact of population growth.

The three aspects of women's status most frequently linked to fertility are their education. employment and type of husband-wife interaction. The effects of these three factors on fertility vary considerably across national boundaries and even within the same society or community and as such, no direct cause-effect relationship can always be established.

Women's Education (See chapter on Education)

Husband-wife relationship (also see chapter on Family size)

Working Women - Women in the Labour Force

There can be no doubt that the working woman, especially the working wife and mother, makes a greater contribution to the household decisions, particularly that of family size, than the woman who stayed 'at home'.

The fact that the working wife brings home a wage, itself elevates her near to, or on par with the status of her husband as a decision maker. If work. moreover, involves the necessity of a woman being educated, and it usually does to varying extents, this in itself will improve her ability and status.

Historical Evolution of a Woman's Status in India.

In the Vedic age (2500 — 1500 B. C.) women had considerable freedom to move about in the family and society and they took an intelligent part in public affairs. They were educated like boys. Marriage used to take place at the age of 16 or 17 years. They had an effective voice in the selection of their life partners. In social and religious gatherings they occupied a prominent position. Women had absolute equality in the eyes of religion. In the family the status of wife and mother was an honoured one. Ordinarily monogamy was the rule. Widow

marriage was permitted but this was usually within the family. But women could neither hold nor inherit family property.

In the age of Brahmans (1500 to 500 B. C.) gradual changes in the status of women had started. According to Atekar, girls who went through a course of education were commonly from the higher sections of society in which some of the women attained distinction in the realm of theology and philosophy and a considerable number of them took up a teaching career. The age of marriage for girls continued to be about 16 and they had some voice in the selection of their life partners. Divorce was permitted to the wife though it was not extensively utilised.

It was in the age of Sutras & Epics (500 B. C. –500 A. D.) that the status of women changed considerably. Certain forces in society began to clamour for early marriage at 9-10 years of age. Procreation of a son became a religious necessity for he alone could discharge certain ritual obligations to the ancestors. Girl's education was discontinued and as such, young brides ceased to have any voice in the choice of marriage partners. Widow marriage was opposed. A wife was expected to provide all services needed by her husband and to keep him satisfied. The dictum that a wife ought to respect her husband as a "god" even if he were vicious, a drunkard and devoid of merit was accepted as applying to all women. Practice of sati was gradually established by A.D. 700. The theory of perpetual tutelage of woman was clearly formulated by Manu - the law-giver of Hindu society - according to whom woman was to depend on her father in childhood, on her husband in young age and on her sons in her old age. Thus she was socialised and was expected to play the role of a person completely dependent on man with no opportunity to take decisions on her own. The status of woman continued to deteriorate during the Age of Smritis (A. D. 500 - A.D. 1800) and Muslim rule till they had almost no status in the society and none in their own estimation.

During the British rule, legislation aimed at raising the status of women was passed owing to the pressures of various movements initiated by reformers like Ram Mohan Roy, Mahatma Gandhi, Ranade, Vivekanand, Dayanand Saraswathi,

Annie Besant, the Indian National Congress, Indian National Conference, and organisations such as Women's Association founded by Sarojini Naidu, Arya Samaj, Ramakrishna Mission.

The education of women was encouraged, the age of marriage was raised and employment for women was made feasible. The second World War also played a part in the emancipation of women. But this influence was almost entirely restricted to women of the urban middle-class since industrializa tion and the mobilization of men in armed forces created vacancies for women in factories and the professions.

With the advent of Independence (1947) the pace of change in the role and status of women in India was greatly accelerated. By virtue of various Acts and Statutes the Child Marriage Restraint Act, 1929; the Hindu Gains of Learning Act, 1930; the Hindu Succession Act, 1956; Special Marriage Act 1958 Dowry Prohibition Act, 1961; and the Hindu minority and Guardianship Act, 1956–which forbade discrimination among citizens on the grounds of sex, women can claim the rights and privileges of a man. Urban women have entered higher education and are holding official positions in various types of salaried jobs and occupations. The Administrative and Foreign Services of India have also been opened to women. They have been elected to the Lok Sabha and the percentage of women M.Ps. in both the Houses is decidedly higher than that of the other countries like the U.K., the U.S.A. and Japan.

According to the theory that biology determines psychological traits and functions one may conclude that the women's primary role is that of child-bearing, child-rearing and home-making. The physical scientists more than other scholars have probably stressed the social differences that arise out of the physical characteristics of the two sexes. Their studies tend to support the notion that woman is physically the weaker sex because of which she has more passive sex and social roles. But the services that women in various countries rendered during the First and Second World Wars amply proved that they are able to do various kinds of work and have much more physical endurance and tolerance for hardships than was commonly believed.

The psychologists from Havelock Ellis onwards seem to have been less certain than the physical scientists about the relation between anatomical structure and social behaviour.

In India, the women's participation and achievements in exra-familial activities and spheres, especially after Independence has proved that psychological straits and their concomitant behaviour patterns are developed by the socialisation patterns, environmental stimulus and opportunities given to them. Recent studies indicate that the attitudes of the educated women have certainly undergone a considerable change regarding their role and status in society. But have the attitudes of society and especially of men towards the role and status of women also changed? There may be a gap between this change in their roles and relationships and acceptance of this change by other family members and by society as a whole.

That such a gap exists by studies of working women shows that "the attitude towards married women has changed considerably. It has been found that it is no longer considered derogatory for the wife or daughter-in-law of a middle-class or even of an upper class family to hold a job. Even the elderly women of the family want their daughters-in-law to take up gainful employment. 86% of the husbands of working wives want their wives to work or at least do not mind them doing so. This is mainly and almost exclusively for the financial gain to the family. Where the woman is a professional or has a socially prestigious job, this is also a matter of 'family pride' for the family. But with this is the unchanged traditional attitude of the husband that household work is a woman's job, and that her wage should be spent more in accordance with his wishes than hers.

Fonseca explains it thus: "Low role expectations arise with a change in the social set-up. Many present expectations reflect a past society, where the roles of husband and wife are fixed by tradition. This way of life has largely passed, but many of the role expectations linger."

The wife then feels justifiably resentful of her twin tasks of working woman and housewife and mother and this no doubt affects her profoundly in her attitude towards having children, either in the spacing or in limitation. This role strain

imposes a burden which disturbs the delicate balance of the husband working - wife relationship. A equilibrium must be found to restore the balance, or one of the partners may withdraw from their relationship, causing tensions dependent on the degree of withdrawal, frustration and maladjustments.

Employment patterns of single and probably also of divorced women are most similar to those of men. The employment patterns of married women differ substantially from country to country, however, even in the developed countries still only a minority of them are economically active. A two-peak age distribution of labour force participation rates of married women is the prevailing pattern in developed countries, the peaks being around the average marriage age and around the age of 40. This means that a certain proportion of women employed at the time of their marriage stay at home during their childbearing period and then return to work. As gradually more middle-aged married women resume employment after their children are relatively independent, they are gaining a majority in the female labour force.

Evidently the most important factor determining the fact whether or not a woman is working is the number and the age of her dependent children. On the other hand the length and type of employment influences the amount of children a woman has.

Occupations with least interrupted working careers are domestic servants. nurses, actors, artists, musicians. Women with challenging professions, natural scientists, medical technicians, etc, seem to stay at home more often than others when they have small children.

Female Employment In Rural Areas :

There is little evidence to suggest that women employed in rural areas in developing countries or in traditional rural sectors of more developed countries, show any desire to have smaller families than do unemployed women. Women are expected to work as well as bear children and the two roles are not seen as mutually exclusive. Because of the extended family

structure, it is relatively easy for a mother to find other people to care for her small children while she works. Her work opportunities are extremely limited, being confined almost entirely to agricultural labour or work in cottage industries. The pattern of high fertility which exists in this type of society will persist unless major alterations are made in the social structure.

Female Employment In Urban Sectors :

The conditions of the working women in urban areas in developing countries differ from those in rural areas in 3 main ways: i) Job opportunities become slightly extended to include domestic and factory work; ii) employment shifts from the category of unpaid to paid worker: iii) the home is no longer the centre of economic activity. The last factor is most frequently thought to have an effect on reducing fertility because it increases the conflict between the role of mother and worker. However, there is a little evidence to explain this as causing a decline in fertility.

Studies have shown markedly lower fertility amongst economically active women in urban areas than amongst their inactive counterparts. This could be accounted for by intervening factors such as age, education, spinsterhood, childlessness and subfecundity. One study emphasized that subfecund women tend to seek employment.

Sinha suggests that the lower Labour Force Participation Rate (L.F.P.R.) of women in urban areas in India and Pakistan could be due to their aspiring, as a result of their education, to better jobs than are available and the different social organization of economic activity in urban areas. Increasing urbanization must therefore be expected to induce a lowering of the overall female L.F.P.R. during the next decade or two.

The recent experiences of Japan, Taiwan, Bulgaria, etc. support the contention that declines in fertility occur along with greater modernization including that of women.

In this day and age one cannot but mention, even though briefly, the role of the women's liberation movement

in affecting the attitude and behaviour of women, at least in some societies.

It is too early to evaluate its effect but it should be kept in mind. It must be remembered that it is equal rights that should be won for women. Some women liberation fans go too far in my opinion and sacrifice the personality and privileges that should be woman's rightful heritage.

The family is the main area where the claims of women's emancipation diverge most strongly from the demands for women's liberation. Emancipation means equal status for different roles—in our present context, greater status for such distinctly female roles as wife and mother, and an extension of the freedom that the individual woman already has to define these roles according to her particular needs and outlook.

Liberation is not a more radical extension of this; it is a demand for the abolition of wife and mother, the dissolution of the family. This is how Kate Millet expresses it :-

As long as every female, simply by virtue of her anatomy, is obliged, even forced to be the sole or primary caretaker of childhood, she is prevented from being a free human being. The care of children, even from the period when their cognitive powers first emerge, is infinitely better left to the best trained practitioners of both sexes who have chosen it as a vocation, rather than to hurried and all too frequently unhappy persons with little time or taste for the work of educating minds however young or beloved ..... the family, as that term is presently understood, must go. For the really "liberated" woman, the love of the mother for her child is anti-social." Let us hope that these views never gain ground in India.

The Role of Men

The man in India is the dominating figure on the scene, as he is still, in Western society. In India, the genesis of the pride of place given to a man might possibly be attributed to the concept of reincarnation in Hinduism.

For a Hindu, the soul after death may come back again through another birth. In between, the soul is in temporary sojourn, which may even be in a place called Hell. If so, the soul can only be rescued by the eldest son and, therefore, the sacred importance of having a son.

In the absence of male issue, the parents are allowed to adopt a son. The rite is civil as well as religious; its main object is spiritual. The place of the male child in the family is so elavated that procreation becomes a sacred duty. (This procedure of adoption should be emulated by others who would prefer to have their own male issue even after several female issues.

According to the traditional norms of Hindu society, a husband is expected to be an authority figure, whose will should always dominate the domestic scene. As the head of the household he should demand respect and obedience from his wife and children. The wife should regard him as her master and should serve him faithfully. It is the husband's responsibility to provide adequately for the maintenance of his dependents, and the wife's duty to run the household frugally and efficiently. In an ideal home, all major decisions are taken by the husband, sometimes in consultation with his wife and grown-up children, but the final say in all matters connected with the family is the husband's.

In the joint family system, conjugal love takes nothing away from filial love. The sons remain at home and their wives come under the direction of their mother (in case of her decease, the eldest daughter-in-law takes her place) who initiates her daughters-in-law into household management and family tradition.[16]

The young baby boy in rural India grew into childhood and was then automatically involved in labour. He was either tending the cows (or sheep or goats) or helping in the farm work. There was no period of care-free adolescence or student life. before several years of work had passed he was married and started to bring up his own children.

The present growing awareness that women will not tolerate autocracy or be dominated makes the young man

diffident of his role today. In former days, his marriage was " arranged " for him. Now he has to prove his worth and go through the process of courtship for which he may be totally unprepared.

Changes in the attitudes of married couples to marriage is causing an upheaval in many marital relationships. In a study on " marital adjustments in upper caste Hindu couples, Joti Barot says that in the attitude of modern wives, the emphasis has shifted from self sacrifice to satisfaction". The husband often experiences a conflict of values as he is pulled by two opposite images, the images of traditional housewife and that of the modern wife.

The wife holding a full time job did not seem to significantly affect marital happiness, though 40% of the husbands and 34% of the wives reported differences of opinion on the wife continuing to work.

It was found that 85% of the wives and 72% of the husbands viewed marriage as a " sacred and social bond which should not be broken under any circumstances". Only 25% of the husbands and 15% of the wives felt that the marriage contract could be revoked in cases of great dissatisfaction and unhappiness, while 2% and 2.7% respectively, felt marriage was exclusively for personal satisfaction and could be dissolved when it became inconvenient."

The "obedience" of the son towards the father was total. Even his relationship with his elder brother was extremely respectful. However distasteful, this system had the advantage of being able to provide emotional support in times of stress or crisis. This help is missing to a large extent in the new pattern of family life emerging.

With the social changes taking place, the rigidity characterizing former relationships with the family and community is necessarily relaxed and informal in nature. The importance of the man, in his role of husband or father is decreased. His very authority is challenged by the earlier independence of his children and even by his wife should she be working, or be

educated to believe herself his equal. This situation is seen clearly in the western nuclear family pattern, when sons or even daughters leave the home not when married as was the former practice, but when earning and therefore as financially independent individuals.

In India, the traditional authority of the father as head of the household is being questioned. He is no longer 'awe-inspiring', the sole breadwinner or the only influence in his childrens' lives. Actually, it is the middle class families which look to the future and constantly seek to improve their prospects and be socially mobile, that preserve to any appreciable extent the traditional pattern of authority, reinforced by socio-religious practices. For the lower class whose main purpose in life is coping with the burden of daily existence, as well as the upper class whose life patterns are such that parents and children do not share things and time to the same extent, the "gap" in communications between parents and children is daily widening.

In a study quoted by Renu Chahil, "the age of marriage feasible for boys was 24, as stated by over 75% and 20-23 years for girls. In fact 80% of the girls wished to be married between 20-23 years, whereas the boys opinions on this were divided, in that approximately 50% felt that 18-19 years was the right age for girls to be married. This shows the breakthrough that has taken place in the attitude towards marriage.

Studies clearly reveal that rural youth are moving from established traditions towards modernization in the context of urban living since to them modernization is implicit in urbanization. [19]

"Man has to transform his role as head of the house, into one of dialogue and exchange between equals, and will enlarge his capacity for relationships according to the dimensions of the society in which he lives ".[20]

With the age of marriage rising there is a better chance for the man to be prepared for his changed role as husband and father, especially as one made necessary by the nuclear family, which brings all the family members very close together and provides no 'buffer action' of elders or parents.

The increasing use of contraceptives by women has further increased her independence. No longer is pregnancy a deterrent to sexual intercourse outside or within marriage. The former has many serious implications.

It is interesting to note that of all the countries in the world, men in India comparatively, most commonly resort to vasectomy as a method of birth control. One wonders if there is any relationship between the India man's confidence in his masculinity that he should so readily choose to be vasectomised whereas in the West his counterpart not only does not choose to have this method of birth control, but is noted to have a moderate amount of mental and emotional difficulties when vasectomized (Worlfers, UK. 1971),

Coitus

"It is the male rather than the female partner who is chiefly responsible for the regularity of marital coitus."

The sexual desire is much more powerful and much more urgent in the male than in the female.

It is the male adolescent that goes through a turbulent era of sexual awakening while the female adolescent blossoms slowly into womanhood. It is the adult male that finds it difficult to be continent while the female can go through spinsterhood with greater ease. It is the male that seeks genital expression of his emotions while the female tends to affectionate and romantic expression.

And if it is true that the Androgens are the hormonal basis of the libido then all the more will it be easy to understand the determinant role of the male in the initiation of coitus.

At the moment the male is the key to the sex relationship though as women develop increasing independence they may play an equally initiating and determinant role. [21]

There is wide agreement that there is a lack of family life education and training for the boy at school and the husband in later life. While the woman has a natural bent from girlhood towards her future role as wife and mother, especially so

in India, where marriage is almost universal, the preparation of the male for his future role is grossly neglected.

The demands made by marriage and family planning on the husband are less, whether it be by society or by his own family. This is reflected in the fact that even in Western societies the contraceptive technology is directed mainly to the woman. Moreover, in induced abortion the woman incurs grave risk emotionally and often physically, and no comparitive sanction is visited on the males either by society or the law.

FERTILITY

There is evidence that for a great many individuals the number of children they would like to have and their actual family size are not the same. "Desired" family size can differ even from "ideal". Some individuals may believe two children to be ideal, but still desire to have four. Also, the desire for a particular family size is a concept that is not meaningful to all individuals.

K. B. PIEPMEIER

Family Size and its Determinants

The determinants of family size are several and complex. Even in the same society they change over a period of time, and for the same family there may be several contradictory types of wants and needs so that a husband and wife may feel quite differently about family size, though not for the same reasons or vice versa— that is they may come to the same decision of family size for different reasons.

In considering Family size, the fact of fertility is paramount. Fertility is defined as the reproductive performance, and can be measured by sum of births, crude birth rate, general fertility rate, age-specific rate, total fertility rate, gross reproductive rate, and net reproductive rate.

Fertility behaviour, as it necessarily involves two people of opposite sexes is essentially a process of socialization. It is an extremely complex area of behaviour, its connotations little understood even today.

" Fertility has left the biological and social field to become a part of behavioural science," — Jean Borgeois Pichat; Several variables effect fertility for eg :-

1. Those governing the formation and dissolution of unions in the reproductive period for example.

a. Age of entry into sexual unions.

b. Permanent celibacy.

c. Amount of reproductive period spent after/or between unions.

2. Those governing the exposure to intercourse within unions.

a. Voluntary abstinence.

b. Involuntary abstinence.

c. Coital frequency.

3. Factors affecting exposure to conception.

a. Fecundity or infecundity, as affected by involuntary causes.

b. Fecundity or infecundity, as affected by voluntary causes.

c. Use or non-use of contraception.

4. Factors affecting gestation and successful parturition.

a. Foetal mortality from involuntary causes.

b. Foetal mortality from voluntary causes.

Some useful parameters in Fertility assessment are the following.

Age Specific Fertility Rate : is defined as the number of live births per 1000 women in specified age-group (eg 15-24 ; 20-24 ; etc). In India 75% births take place in the 15-24 years age group.

Total Fertility is the sum of age specific fertility rates from ages 15–19 to 45-49 years. It can be expressed as per 1000 women or per woman. In India total fertility is approximately 5.6.

Gross Reproduction Rate is the sum of female age-specific fertility rates (i.e. female live births), expressed as per woman. In India the rate is approximately 2.8.

Net Reproduction Rate Based on the Gross Reproduction rate, but taking into account the probability of women dying before the end of the child bearing period with the age — specific mortality rates of the chosen population and period of time).

Net Reproduction Rate measures the rate at which the population is replacing itself. If in a certain year 1000 women between the ages of 15 and 19 had 100 girl babies and 1000 women between 20 and 24 had 400 girl babies, and so on, then in the imaginary example used, one will find that the original 1000 girls can be expected to bear a total of 705 girl babies. In this case the net reproductive rate is 0.705. If the rate is one (unity) the population is assumed to be exactly replacing itself. The rate is approximately 1.8. The mean length of a generation, in India is approximately 31.4 years. This can be equalled to the mean age of female child-bearing, From the peak at 25 years, fertility declines slowly for the next 5 years and is very near the peak. The decline becomes sharp only after the mid maternal age of 39 and continuous upto the age of 45. It is thus the failure of the fertility to decline sharply from the peak and the prolonged reproductive span under conditions of uncontrolled fertility which are instrumental in pushing the mean child bearing age of the women to the higher side consequently the length of the generation is enhanced.

Age Structure of Fertility

Age of Menarche is variable It occurs from between 12–18 years. Lower ages are found in better nourished and well developed girls. Among Indian schoolgirls who come from the upper, middle and upper lower class (corresponding to social classes I, II and III) the age of menarche was found to be 12.6 years. Several studies in fertility research have been done, and the relevant hypotheses relating to physical, social and psychological factors are grouped into 6 categories.

I Age structure of fertility.
II Modernization, Status and Security.
III Community and Family Background.
IV Interest in home and Children.
V Personality Characteristics.
VI Marital Adjustment and Husband-Wife Relationships.

In Papua, New Guinea, studies showed that mean age at menarche was 18.5 – 19 years. (Their basic diet was carbohydrate and nutrition was very poor.) Genetic variation may also be a cause.

2. **Age at Menopause** in developed countries is about 48 years. But it is difficult to determine definitely because in the U. K. for example universality of family planning makes determination of end of child bearing very difficult.

In developing countries, the age at last pregnancy gives some ideas of age at which menopause occurs.

In India 37 years is given by the Khanna study and 34–35 years by the Thapar study.

Using the Median Age at last pregnancy (50% above had 50% below it) and if there was no contraceptive used, 43 years might be the approximate figure.

In developing countries it seems that age at which sterility intervenes is much lower, maybe as much as 10 years.[2]

3. An important social custom in India, and perhaps also in the past in Europe was that a couple ceased to have intercourse altogether or reduced the frequency of it when they became grandparents.

However as health and nutrition improves in developing countries the length of the period of childbearing or exposure to pregnancy is also increasing.

Taking the interval between births, the period of post partum infertility when women enter this period is approximately 11 months, But in developing countries the Live Birth interval is 30 months. This long birth interval is due to post partum infertility, and prolonged breast feeding.

This birth interval goes up with age. In developed countries it is not so long, because breast feeding is not as common or prolonged. However use of contraceptives can prolong it, as they do in these countries.

After a stillbirth, the woman is likely to get pregnant quicker than after a live birth and this affects fertility directly.[3]

However fertility is nowhere near the "biological maximum" although in societies where marriage is early and fertility unchecked it may come close to a "natural" level, with gross reproduction rates of 3.5 – 4 which corresponds to an average number of 7–8 births to woman surviving to the age of 45. Actually no major population in the world today has a gross reproduction rate above 3.5, and no one falls below 1.0.

Age at Marriage One of the most important factors affecting fertility and therefore family size is the age at which a woman marries.

Most of human fertility occurs in marriage. Illegitimate births rarely represent more than a tenth of all births; when they do they are often issued from stable consensual unions that have many characteristics of marriage but merely lack official recognition.[5]

Women who marry early have children. Demographers have shown that even when the gross reproduction rates in 2 countries are the same, the birth rates would be higher in that country where female age at marriage is lower.[5]

Late marriages in Ireland was a classical example of being responsible for small size families.

From an evolutionary standpoint, early marriage would seem to promote survival of the species. Yet among humans evolutionary forces rarely work themselves out directly, and it would be an oversimplification to regard the early age of marriage as a simple evolutionary adaption. Cultural behaviour almost always intervenes between biological needs and their satisfaction, That this is true for age of marriage can be seen by the variety of social structures that tend to promote it and more significantly by the far fewer cases which tend to discourage it.[7]

In the developed world if birth control were absolutely effective, with no unwanted children, the age at marriage would generally have minor influence on the number of children per family. A fecund couple would have the planned number of children, say 2 or 3, whether they married at 20 or at 30 years of age. Of course, age at marriage is not completely irrelevant. First, those women who marry late have often acquired other interests from prolonged studies or a profession, and may well desire a smaller family than those who have devoted themselves to their family since they emerged from adolescence. Second, there are subfecund people who will require maximum exposure to the risks of childbearing to have all the children they want; moreover, sterility progresses with age, and there are women who will lose their chances of maternity by postponing marriage too long.

An early marriage enhances the chance of later unplanned pregnancies for if a couple has achieved their family building goals by the time the woman is aged 25, they may face 15 to 25 years of exposure to the risks of an unwanted pregnancy; with 99% effective contraception, more than one-third of such couples would have at least one "accident."[8]

The question of changing marriage patterns and propensities has long been discussed as a possible explanation of

the increased rate of population growth during Western industrialization, but Hajnal has shown recently, that the basic change in Western European marriage patterns was of the reverse order and that it occured well before the 18th century. For some 300 years or more, Western Europe displayed marriage patterns markedly different from those of Eastern Europe or, as far as one can judge, from those of underdeveloped societies.

In the latter regions, marriage appeared to be more "natural" in character in the sense that it took place (not too long after physiological maturation) and was almost universal. This seems also to have been the case in Western Europe in the Middle Ages. But by the 17th century the new and "artificial" pattern was becoming established. The "facts" thus are different from those which are widely assumed to have obtained and the problem of "explanation" is correspondingly different.[9]

The Japanese have exhibited another adjustment-postponement of marriage. The proportion over married among girls aged 15-19 fell from 17.7 in 1920 to 1.8% in 1955, and for women 20–24 it fell from 63.6 to 33.9.

The shift for men was also drastic. Indeed, it may be that the age at marriage rose faster in Japan than in any other country in history. But 1959 the nation had a marital age higher than that of most western countries. In the U. S. (1959) nearly half the brides in first marriage were under 20, but in Japan only one-nineteenth of them were that young.

In addition the Japanese migrated from their homeland in sizeable numbers. The proportion of Japanese persons aged 15–59 outside to those- inside the home island was 2.8% in 1920; 3.2% in 1930; and 5½—6% in 1940.

Thus the Japanese showed a multiphasic response to population pressure.[10]

In India the censuses taken (1901-11) showed an average age 13 years for girls at marriage, and a woman marrying at such an early age tended to have her first child at an early age, though it is also said that child marriages caused ,,more fecundity impairment than it promoted births."[11]

It was found in a Mysore population study that females in the rural areas marrying between ages 14 and 17 years gave birth to 5 9 children, while those marrying between 18-21 years gave birth to 4.7 children.

Legislation has now been introduced to raise the present age of 18 and 15 years to 21 and 18 years for males and females respectively in India. [12]

It has been calculated that an increase in the mean age at marriage of females by 3 years during the period 1891–61 in India has resulted in a 3-4% decline in the birth rate over the period.

It has also been estimated that if female age at marriage in India increases to 19 years or more and no female has a child before the age of 20 years, the birth rate may decline by 25-30% over the generation. [13]

However Das (1967) who looked at the marital fertility rates in Madras and Kerala and matched them against the prevalent age at marriage in each of the states to see if there was any connection. In Mysore, about 93% of the women in the age group 15-24 are married, in Madras about 75%, and in Kerala only about 57%. One would, therefore, expect marital fertility to be highest in Mysore, if only by a small margin but the fertility rate in Kerala is higher than that in Madras. It seems that the timing of births is simply postponed in the southern state, and that the number is not reduced by a higher age at marriage. Das is thus pessimistic about the likely effects of a rise in the age at marriage on India fertility, suggesting that marriage must be postponed to a very late age for it to affect fertility to any significant extent. [14]

Whereas in most other countries, social legislations are likely to precede social change. It is, however, to be appreciated that social legislation alone will not necessarily bring about increase in the age at female marriage. Unless schemes are introduced so that unmarried girls can go to school for formal education or be otherwise fruitfully occupied,

they might become the cause of serious social concern - in a society which puts a high value on virginity before marriage.

It is noteworthy that raising the female age at marriage will not only influence fertility performance directly but also indirectly, as the girl marrying later will be more mature, hopefully more educated and therefore more amenable to the acceptance of the ideas of a small family.[15]

In the past in rural India, parents usually sought to get their daughters married as soon as they reached puberty. Often it was even earlier. It was the sign of one's affluence or status to get one's bethrothed before puberty and it was a matter of pride and prestige that one's child was sought after at a tender age. Thus early marriage became popular and gradually the practice became so compelling that a departure from it was a matter of social disapproval and even of social disgrace.

The higher castes were often more particular about early marriage, though some lower castes in their attempt to climb up the social ladder follow suit. However the "child-bride" did not live with her husband when marriage was contracted before puberty. And already early marriages are well on the way out.

"The mean age of women at marriage varies from 16.8 for India to 25.5 for Ireland. The corresponding ages for men are 21.8 and 28.5. China is using the raised age at marriage as a campaign by advocating and positively discouraging marriage before 26 years for women." In Tunisia, a law of 1961 raised the minimum age at marriage to 17 years for women and 20 for men.

The early age at marriage in the traditional Asiatic Agrarian societies is related to the characteristic features of their social structure, religious beliefs and value systems. The age at marriage of women is generally higher in societies with a higher proportion of literate teenage girls. In kinship oriented societies, girls are married off earlier for economic advantage, for prestige, or to maximise changes of procreation especially of male issue.

In western societies, early marriages are often the result of premarital conception.

The age of marriage is related to the welfare of women, both from physical and social points of view. The chances of miscarriage or stillbirths increase with increasing age of women at marriage. The social advantage of a delayed age at marriage of women is that they can develop their own ambitions. It may make them more selective as to whom they want to marry, if they marry at all.[18]

In general, the fertility curve by age has an inverted u-shape; low but rising sharply in the mid-to-late teenage category, highest for women in their twenties, then declining slowly for women past 30 until menopause, which occur normally between ages 45 and 50.

The impact of the gradual loss of fecundity (the ability to procreate as opposed to fertility which is the actual procreative performance) which accompanies ageing, should be noted.

A United Nations study (1965) has classified countries into 3 types according to the maximum or peak age of the fertility curve and according to the behaviour of the fertility curve around the peak.

In the broad-peak types, typical of less developed countries, age specific fertility rates for women aged 20-4 and 25-9 differ only slightly; however each of these rates is somewhat higher than those of younger and older women. Only the onset of sterility and menopause appear to be associated with a dramatic fertility decline.

More typical of developed countries are the early-peak or late-peak types. These are differentiated by the attainment of maximum age-specific general fertility rates in the 20-9 age category or the 25-9 age category or the 25-9 age category. Mitra (1967), pursuing the analysis with single year age-specific fertility rates, has added to these basic patterns. He notes that voluntary fertility control has the effect of reducing the range of the effective fertility period. In societies which have largely

completed their demographic transition, pregnancies do not occur in large proportions at very early or very late fertility ages, and a decline in fertility tends to be followed by a deadline in the variance of age-specific fertility rates.

The major determinants of age patterns of fertility appear to be age of marriage, the proportion of women married who are in the 20-9 age category, and the social and biological determinants of fertility control within marriage. *Marriage is the first factor which regulates the production of offspring in the less developed societies* (Bourgeois-Pichat 1967). Under conditions of minimal fertility control within marriage, age of marriage can be the key parameter of total fertility. However, where there is significant marital fertility control, age of marriage may be more significant in defining fertility timing (the early-peak types) rather then total fertility.[19]

It is interesting to note one striking fertility pattern in India ; the Parsees in India (descendants of Zorastrian conquerors still adhere to strict social and religious norms of behaviour. They live mostly in towns and follow commercial and industrial enterprises and many are relatively well off. But the birth rate is much lower than those who follow other faiths (about 20/1000 C.B.R.) This is achieved, apparently, mainly through late marriage of both males and females and by a sizeable proportion who remain celibate throughout their lives (Lorimer 1954: summarizing Chandrasekhar 1948.)

Modernization, Status and Security

In countries which are not 'welfare states' the economic benefits of increases in national income are largely restricted to those above the poverty line. Therefore, status and security—which are closely linked together are very tangible qualities, secured to a certain extent by the majority below the poverty line only by means of a large family and especially, sons, to help and support the parents in their old age.

Several investigators have considered the problem of how many children would be necessary in developing countries to have a son live until the father was 65 years of age (to support parents in their old age). Their statistical model indicated that in India where there is a life expectancy of 50 years 1976; it would be necessary for the average mother to bear 5 children if the couple were to be 95% certain, that one son would survive to the father's 65th birthday. The model indicated that this would result in an annual rate of natural increase of about 2.5% for the country. The village families with no knowledge of computer science, seemed to be aware of the basic facts of the model.

The economic decision theory represents the approach (Beckler 1960 ; Easterlin 1969 ; Spengles 1966); whereby childbearing is viewed as a household choice determined by the relationship among income, prices, attached to children, and tastes (preference values) related to children.

Economic improvement is an essential factor in the process of modernisation, and changes in reproductive behaviour occur due to pressures which emerge as a result of the modernisation process itself. In most pre-modern situations, the typical household feels little need to regulate fertility, because under the prevailing circumstance of widely fluctuating mortality, the prospect of having the number of children desired is very uncertain. Modernisation, however, shifts the typical household situation to one in which the potential output of children is considerably larger than the number wanted. With the growth of unwanted children as a serious problem, there merges a motivation to regulate fertility.

Among the complexes of changes comprising modernisation, several seem especially important in bringing about the shift to modern conditions of child-bearing. Historically, these have been :

1) innovations in public health and medical care
2) innovations in formal schooling and mass media,
3) urbanization,

4) the introduction of new goods, and

5) *per capita* income growth.

Items (1) and (2) may be thought of as relating particularly to social modernisation, and (4) and (5) to economic modernisation. Item (3) might be classified under either head, but is treated here as aspect of economic modernisation. The following paragraphs elaborate briefly on the nature of these aspects of social and economic modernisation, as historically observed. More recently in a few countries another aspect of social modernisation-family-planning programmes – has perhaps also played a noticeable role in influencing reproductive behaviour.

With regard to education, modernisation has involved a shift in schooling from the home and religious institutions to schools operated by the state. Compulsory universal primary school education has resulted in the virtual elimination of illiteracy. Secondary school and college enrollment have also increased, but less sharply and at a later stage of modernisation. In the area of mass media, there has been a marked rise in news paper and magazine circulation *per capita*, and more recently increases in *per capita* cinema attendance, and the availability of radio and television receivers.

A number of factors in this modernisation process contribute to creating a potential oversupply of children of a married couple would tend to rise as natural fertility and prospects of infant survival are increased due to improvements in health education and nutrition. The demand for children tends to decline because of an adverse change in "tastes" and an increase in the relative "price" of children, Tastes are affected adversely because the growth in formal education and mass media, urbanisation and new consumer goods, along with greater concern about the "quality" of children, emphasize life styles which are typically competitive with having children.

Urbanisation raises the price of children by shifting the population to an environment where mothers have more opportunity for work and children less, and where the cost of food, an important item of child cost, is higher. Education

too raises the price of children, for example, by increasing the alternative value in market work of an hour of a mother's time. Growth in *per capita* income during modernisation tends to increase desired family size, but this influence is balanced by the effect this growth itself has on what young adults come to view, due to their economic socialization experience, as their minimum acceptable standard of comfort. (The effect of income growth on household resources compared with that on tastes may get out of balance in the short run, causing swings in fertility around the trend).

The developments raising the potential output of children above demand, by increasing the prospect of unwanted children, lead to the emergence and growth among households of a desire to limit fertility. The point at which this motivation results in actual adoption of fertility control – fertility regulation. These are of two types – psychic costs (the subjective displeasure associated with the idea or practice of fertility control) and market costs (the time and money necessary to learn about the use specific techniques). Modernisation impinges on these costs through urbanization, education, and the associated expansion of the mass media. These developments reduce market costs by increasing access to methods of fertility limitation and they lower psychic costs by legitimizing the practice of fertility control. Modernisation also results in innovations in fertility control methods, further lowering the costs of fertility regulation.

Thus while the forces of modernization lead on the one hand to greater motivation to limit fertility, on the other they make fertility regulation easier by lowering its subjective and market costs. Eventually the balance between motivation for and costs of fertility regulation tips in favour of the practice of fertility control. Fertility, which was heretofore governed by biological factors and social practices determining natural fertility, becomes a matter of individual choice by the typical household. As long as fertility control costs are positive, there will continue to be some unwanted children, but in the course of time, actual family size tends to converge toward desired family size.[21]

To individual parents, the value of prevented birth as affecting them show that if economic determinants have any influence to all on the number of children parents will have—and all evidence suggests that is so - then it is natural to adopt the approach so as to take account only of the economic consequences to parents. To be sure, in a society with a firm structure of extended families, it makes sense to consider individual families or tribes as societies in themselves, pooling their resources and taking a long view of the future A looser family structure, on the other hand, imposes a different view of the claims which individuals make upon one another.

When the situation is seen from the parent's point of view, the relevant flows of income and outgo will not be the same as in the previous case. Some of the "consumption" in childhood may actually be provided by the community–education, health services, etc. On the other hand, parents cannot claim the surplus when the child is grown up. Part of it will be devoted to the support of the third generation. The household and the family are relatively unexplored economic systems, and it would be rash to speculate about these flows.

An interesting generation, however, is when it makes economic sense to have children in order to provide old-age security. Suppose we can estimate probable needs in old age and assume that they will be met by the children. How will they compare the costs of rearing these children in the first place ? Obviously such a calculation does not adequately reflect the functioning of the family as a providence fond or as a solitary unit. It neglects the insurance aspect. the risks of infirmity etc,, not to mention sociological and psychological dimensions. To some extent it nevertheless singles out a problem of some practical relevance, for if investment in children is an inefficient way of providing old age security, the creation of more efficient ways of doing this might reduce the fertility.

A problem here is that in the microcosm of the family, it will not do to assume that out of one birth, some small fraction will survive to support parents in old age. If a system of

pensioning through children is to work at all, there must be a reasonable certainty that a sufficient number will survive to perform their filial duties. It may well be that is a more important determinant of family size than the cost of individual children.

As a form of saving, having children is an activity with a very low rate of return to parents, probably negative. But, however inefficient it is, there may be no alternative. To the peasantry and the poor in underdeveloped countries, possibilities of saving and investing are usually limited on non existent. Where they do exist, real rates of return may be made negative by inflation. The popularity of gold hoarding in many underdeveloped countries, especially among the poor, is an indication of the lack of safe and profitable placement opportunities.

In such a situation, time preference may well be negative in the sense that one is prepared to sacrifice more than one unit of consumption today in return for one unit in the future.

An effective social security system would change the situation. The subsidization of child rearing as widespread in underdeveloped countries and presumably stimulates fertility in some measure. Some form of old age security might at least offset this. In principle it would be one way of providing access to capital markets in which surpluses could be more profitably invested than in additional children. Similarly, the creation of institutions designed to reach and serve small servers — saving banks, pension funds, life insurance — would strengthen the alternatives to internal family protection.

Improved education would have a similar effect by reducing earnings from child labour.

The family planning campaigns in developing countries today may, one hopes, help to reduce the numbers of unwanted children. But there is a strong likelihood that they will not begin to affect the number of wanted children until the basic economics of family size are altered. Social policies which supplements the family as a source of security would therefore not

be regarded as luxuries with a low priority in development planning.[22]

Sex Preference

In a study of 1,395 women who had an I.U.D inserted in 9 New Delhi municipal clinics, the average number of living sons was 2.1 and the average number of living daughters was 1.6. In a rural area study of 892 men who had the vasectomy, the average numbers 2.9 sons and 1.9 daughters. These findings indicating a preference for sons are consistent with the attitudes expressed in a study of attitudes of urban men and women. In this urban study, when asked the numbers of boys and girls considered as "ideal" for themselves, the average numbers were 1.7 sons and 1.2 daughters. This sample may be of particular importance since it represented a relatively well educated group.

The data indicate that few couples in either the urban or rural areas are willing to terminate fertility until they have at least 3 children. Also, that few are willing to adopt f. p. until they have 2 living sons.

Having only one son does not provide sufficient security. He may migrate and cease to support the parents ; there is a tendency, therefore, to make one son stay at home to look after the property. Education for him is discouraged lest he also migrate.

An intensive study of 68 farmers in 8 villages hed been carried out by the National Institute of Community Development. The average numbers of children ever born for the sample was 4. 3 and the average number living was 3.3.

In Mysore State 65% of the women, and 85% of men who had between one and three children desired to have more of those who had 4–6 children, one third of the women and nearly one-half of the men wanted still more children.

Social acceptance or social reward is only one factor resulting in large families. Other factors are family

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* Intra Uterine Device

survival, care in old age, increased family income, a greater share in other property, following the pattern in a community, and to make the home a happy place.

There is a rationale in most of these factors. Having only one son does not provide sufficient security. He may migrate and cease to support the parents; there is a tendency, therefore, to make one son stay at home to look after the property. Education for him is discouraged lest he also migrate. [23]

Community and family values:–

In Indian rural communities especially fertility is highly approved and a woman with many children is accorded the highest respect, particularly if they are well provided.

In rural areas it is taken for granted that all girls get married. This is the parent's obligation and in lower castes this is fulfilled earlier than later. It has been suggested that raising the minimum age at marriage would reduce fertility. But do social conditions in rural India permit this ?

Higher education for girls in rural areas is not generally accepted unless the schools are within easy access. And what is a girl to do with her education since rural opportunities are few? Apart from this, farm boys are reluctant to marry 'educated' girls. [24]

Moreover, marriage is universal, because marriage is regarded as a social duty toward the family and the community, and less of individual interest. The social background, provided by the authoritarian joint family and caste, afforded no scope for the recognition of any personal factor, individual interests and aspirations. The aims of marriage according to the Hindu Dharma-Sutras (i. e. Hindu religious and moral code) are dharma (duty), praja (progeny) and rati (pleasure). Dharma is considered by the Hindus to be of supreme importance; it implies a religious duty and in particular duty towards the family and caste. Therefore, one marries not for

one's individual needs and pleasures but for the sake of the joint family.

Social acceptance or social reward is only one factor resulting in large families. Other factors are family survival, care in old age, increased family income, a greater share in other property in a community, and to make the home a happy place.

With reference to a study in Africa but equally relevant in rural India Angela Molnos says "Cultural information is more relevant and important than psychological information in all those societies in which individual decisions are strongly subject to communal influences. Social anthropological knowledge should be the basis of any social science research into fertility and its possible limitations.

Conversely, in strongly technology-dominated, competitive societies, where the nuclear family is prevalent, ties are loosened and the value of individuality is overstressed, economic, psychological and sociological studies might be the more suitable approaches to understand overall fertility behaviour.[25]

Familial Influences

Several studies have shown the positive association between the respondent's family size and their parent's family size, (In U. S. A.) Westoff and Potvin (1966) state that ideas on family size are internalized by girls in late childhood and early adolescence. Of particular importance in this formation of ideas are the girl's own family size, that of her friends, and that found in other groups with which she is associated.

Greater influence of the wife in family decision making is associated with lower fertility. The wife's decision making role is effected by her participation in the labour force-working wives have a greater part in decisions, particularly those concerned with family size. (Weller 1968).

Of those people who profess to want smaller families not all would begin to control their fertility successfully

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326, V Main, I Block
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Bangalore-560034
India

TABLE 11

MOTIVES FOR AND AGAINST BIRTH CONTROL. FROM (1967)

(FROM "PSYCHOLOGY & POP. "BY FAWCETT).

HIGH FERTILITY MOTIVES

Health
Children often die.

Economic Condition
Children are an economic advantage.
Social security in old age.

Family Welfare
Can help with work around house.
Big families are happy families.
Children from big families have better personalities.
Continue the family name-Strength of the clan.

Marriage Adjustment
Large families promote good marriage adjustment.

Personality Needs
Ego support, virility, manliness.

Community and National Welfare
Large families are good for the community or nation.

Moral and Cultural
Large families are God's will.
Large families promote morality.
Tradition.
You have high status in the community.

Dislike for Contraception
Dislikes use of contraception.

LOW FERTILITY MOTIVES

Health
Preserve health of mother.
Assure healthy children.
Lessen worry and over work

Economic Condition
Everyday general expenses are less.
Avoid worsening present (poor) economic conditon.
Gain a higher standard of living.
Permit saving for future, for retirement.
Desire to avoid subdividing property or savings.

Family Welfare
Improve children's lot in life, give them good education.
Happier family life, more companionship, less tension.
Opportunity to do a better job of rearing children.
Avoid overcrowding of house.
Easier to find a more desirable house or apartment.

Marriage Adjustment
Provides husbands and wives more leisure opportunity.
Improves the sexual adjustment by eliminating or reducing fear.

Personality Needs
Facilitates realization of ambitions.
Facilitates self development.
Facilitates realization of social needs.
Reduces worry of the future.

Community and National Welfare
Helps avoid overpopulation.
Helps community meet demands for education, other community services.
Helps nations with economic development.
Helps reduce welfare burden of the community.

merely because contraceptives were made readily available. There is a group of people whose failure to contracept effectively appears related not to any desire for more children, but to a lack of ability to take action on the decision that they have enough children the family is the decision—making and action—taking unit and as such warrants attention.

The effects of education and social change upon the decision-making process within the family must be examined. The discovery that such educationally influenceable factors such as the family organization and type of decision-making are crucially related to successful fertility control presents family planners and policy makers with a great challenge.[26]

IV. Personality Characteristics

Marital Adjustment and Husband–Wife Relationship

"At the family level, changes in family size indicate changes in the relationship between husband and wife, and between parents and their children"[27]

Interest in home and children personality characteristics and marital adjustments are closely interlinked in their influence on fertility.

'Marital happiness is positively related to general communication between spouses and agreement on marital issues does appear significantly related to success in fertility control. The relationship reflects pretty directly the extent of consensus the wife feels has been attained about crucial marital issues. The marital happiness index and the marital agreement scale are apparently operating at different dimensions of family life.

An expectation that sex satisfaction and fertility control are related is reversed by the findings that wives who are least satisfied with the sex relationship are most likely to have practised birth control over a long period, if they have practised it at all. There is a non-significant indication that the sexually dissatisfied wives also practised birth control more

successfully. There is quite possibly a cluster of items here which factor analysis may identify more precisely as interrelated among themselves and with fertility controls. Dissatisfaction appears frequently in working wives, dominant wives, and wives who are oriented in their values toward striving, whereas satisfaction with sex appears to be associated with male dominance in the marital relations and with the holding of traditional values.[28]

"Attitude studies carried out in India (1962) showed that in rural areas females desire to have an average of 4 children, and in urban areas 3 children with a spacing of 3 years apart. The survey did not reveal any pronounced social and religious opposition towards family size, control and the so called influence of the notoriously dominating mother-in-law in determining family size seems to be eliminated. In fact, it was frequently found that is was the mother-in-law who had prompted her daughter-in-law to resort to contraception."[29]

National Sample Survey of Family Planning practices, sponsored by the Union Ministry of Health and Family Planning shows that nearly two-third of the couples who are targets of the family planning drive are of the view that a couple should have four or less children. On the average, persons who never use family planning methods are younger, have fewer children and have lower fertility. Among family planning propaganda media units, the cinema was found to have the maximum reach among the lower socio-economic strata, compared to the press and radio.[30]

Greater influence of the wife in family decision-making has been associated with lower fertility. Mitchell (1972) in Hong Kong found that the greater influence a wife had in family matters, the more likely she was to practise family planning. He also found that when the desires of the husband and wife for mere children conflicted, the husbands's wishes were more likely to have the greater influence in the decision whether to adopt or not adopt family planning.

Verbal communication between husband and wife was also found to be important in the adoption of family planning. Couples with high levels of verbal communication, a

characteristic associated with higher education and income, were most likely to practise family planning.

Thus decision-making and communication patterns within the family are related to successful fertility control more significantly than to expressed desire or ideal family size. They are also better predictors of reproductive behaviour than are the socio-economic factors like employment and education from which they are derived.[31]

In studies of Indian rural families it was also clear that opinions regarding freedom of husband-wife communication were changing from the older to the younger generation. Both husbands and wives reported that husbands were now more inclined to discuss plans and problems with wives. Some male respondents indicated that they considered this to be a favourable trend. Other respondents considered that it was a loss of male authority and autonomy and dominance by the females. Attitudes regarding increased independence for wives related to age orthodoxy and the husbands' satisfaction with their own marital relationship.

Better communication between some of the younger couples was a result of a desire for a fundamental change in husband-wife relationships. Among some of the older couples, there was expressed resentment about the fact that they had had no choice in the selection of their spouse.

Increased education and self-confidence on the part of some young people, along with some weakening of traditional values and the sanctions that enforced them, had led to greater independence in regard to the selection of a marriage partner and in conducting their own affairs after marriage. It was along with this generally freer association that more open discussions of family were possible.[32]

Regarding the factor of the frequency and distribution in time of heterosexual intercourse during the reproductive period of women, as affecting fertility; it is extremely difficult to obtain information on.

A few societies such as the Yap of Micronesia and Juang of Orissa are reported to believe that excessive coitus is harmful, but there is no evidence as to how this affects frequency. In Nag's sample only among the Yap does a low frequency of coitus appear to be correlated with low fertility. A study by Nag (1970) reports that average frequency of coitus among Indian women is less than among American white women of corresponding age but maintains that this results in a very small difference in fertility levels.[33]

Widowhood has a significant effect on fertility, especially as in India, remarriage, though now not a rarity, is still not the mode.

In India, the incidence of widowhood is high. One study shows that :-

> Till 25 years of age percentage of widowhood is below 10. By 50 years, it is about 50%.[34]

Widow re-marriage appears to be correlated with the type of kinship and family structure and with economic factors including class. Widow celibacy is usually more strictly enforced among upper classes than in lower classes.

The virtue of abstinence finds frequent mention in Hindu literature. Religious festivals, solar or lunar eclipse and even the planting of crops are the occasions for abstinence. Though no extensive surveys have been made, it is doubtful whether these rigid customs persist, certainly not in the towns or cities of India to any appreciable extent. However, delivery of the first child at her mother's home and prolonged lactation are still customary, especially in rural areas.

The Relationship of Parents and their children can be considered in the typical "joint family in rural India which is the source of love, affection and security, so vitally needed for a growing child. Adverse effects of economic misfortunes and inadequacies of parents in relation to the growing child were offset by the protection, provided in the joint family

and the substitute relationships that were available in the family by grandparents, uncles and aunts. Normally, every child is welcome in an Indian family, and no limit is put on their number. In times of difficulty children of even distant relations are taken under the care and protection of the family.[35]

Mothers do not feel frequent childbearing to the same extent as relations are always at hand to care for her and the new baby. If she cannot nurse it, there may be someone in the family circle who can. Elder daughters help her too and the birth of a baby is an occasion for religious and social rituals so important to the average Indian.

" Where there is a popular assumption that extended families favour high fertility, this relationship has not been widely tested. Moni Nag (1965) has found that the average number of children born to women of all ages was lower in extended than in nuclear families. The suggested explanation of the lower fertility in extended families rests upon the average frequency of coitus, found by Nag to be greater in nuclear than extended families perhaps due to lack of privacy and cultural and religious taboos on coitus on certain days."[36]

Marital Adjustment

However, a major challenge to psychologists is to help provide explanations for the differentials in fertility and fertility—related attitudes and behaviour that have been discovered in surveys and to account in psychological terms for shifts over time in such variables. For example—What is the psychological mediator between education and fertility, i.e, what values, personality traits or the life styles are affected by education and in turn fertility ? What are the functions of children for different people at different levels of society ? Is it possible to trace different psychological routes by which people arrive at the same end - state of fertility ? Are the motivations for having children and the values attached to children instilled mainly in early sexual development and socialization experiences or more strongly through adolescent and adult social learning. ?

Typically KAP data have shown that women desire a smaller family size than they are likely to have by the end of their reproductive period; that they are not unwilling to discuss sex, procreation and contraception; that they know little about methods of preventing pregnancy but are anxious to learn.

Wyatt (1967) notes that "The child wish.... varies not only from one individual to the next, but within the individual from one phase of life to another, and shows the influence of collective attitudes on individual motives.

Reproduction even more than sexuality is overlaid with attitudes the individual considers appropriate because he has been learning them ever since early childhood. (Wyatt 1967)

The reasons for wanting children also change over time. Psycho analysis has an elaborate theory about the precussors of the wish in early childhood, but motivation does not remain fixed once fecundity has been reached. There must be a difference for a woman wanting a child before she has ever had one, and wanting, and deciding for, a second or third child. In short, reproduction as a psychological event will best be thought of in pluralistic terms. It is not one act and attitude as the popular idea of "motherhood" would persuade us to believe, but a sequence whose stages may differ vastly in the challenges they imply and the gratifications they provide (Wyatt 1967).

Hoffman & Wyatt (1960) analyzed recent social changes that might alter individual motives for large families. They focussed on 3 aspects of modern society.

1. Changes in the woman's role.
2. Changes in the parental role and concept of parenthood and the
3. Increasing loneliness and alienation of individuals.

These factors, according to their analysis, may interact to produce a shift upward in reproductive desires. Having additional children can alleviate reliance on the increasingly dull housewife's role as a source of satisfaction and can at the same

time provide an escape from the potential threats associated with outside employment. A desire for more children may be bolstered by the growing emphasis in our society on the importance of the parental role and the creative challenges that it offers. In addition, children may represent in several ways a cushion against loneliness and alienation.

Preliminary studies suggest usefulness of 4 motivational categories - altruistic, fatalistic, narcissistic and instrumental - related to desires for children.

Attitudes toward human life in general very likely play a part in individual orientations towards family size and are certainly related to attitudes towards contraception and abortion.

For psychologists, perhaps the most interesting and provocative studies in the pop. field are those conducted by Rainwater (1960, 1965).

Rainwater used the content of the interviews as a basis for insightful observations about the meanings of sex, marriage, and children.

Two aspects of being a parent are important in connection with Family Planning : the meaning of the biological fact of becoming a parent, and the meaning and function of children in the lives of their parents. The first has to do with very deeply felt conceptions of oneself as a man or a woman, the second with the ramified ways in which the psychosocial identity of father or mother is defined in action.

To impregnate and to become pregnant signify to the individual a kind of categorical maturity as adult human beings ; the natural consequence of sexual intercourse fixes more permanently and obviously than can the private experience of love-making the status of adulthood, of being grown up.

Once children have arrived, they take on different meanings ; they come to be individuals to whom one must relate and whose independent existence must be taken into account in the way the husband and wife live. The relatively simple meanings

which having children represent become much more complex as the children become psychosocial realities as well as biological events.

Rainwater's conclusions from studying these middle class and working class American respondents are not comforting to those concerned about excessive population growth.

Looking at the total pattern of rationales for large and small families we can abstract one central norm ; one shouldn't have more children than one can support, but one should have as many children as one can afford. To have fewer is regarded as an expression of selfishness, ill health, or neurotic weakness; to have more is an expression of poor judgment or lack of discipline.

The pro-natalist sentiments of men and women of all classes are apparent in the rationales they offer for large and small families. The good person in a good world has a large family.[37]

THE REPRODUCTIVE SYSTEMS

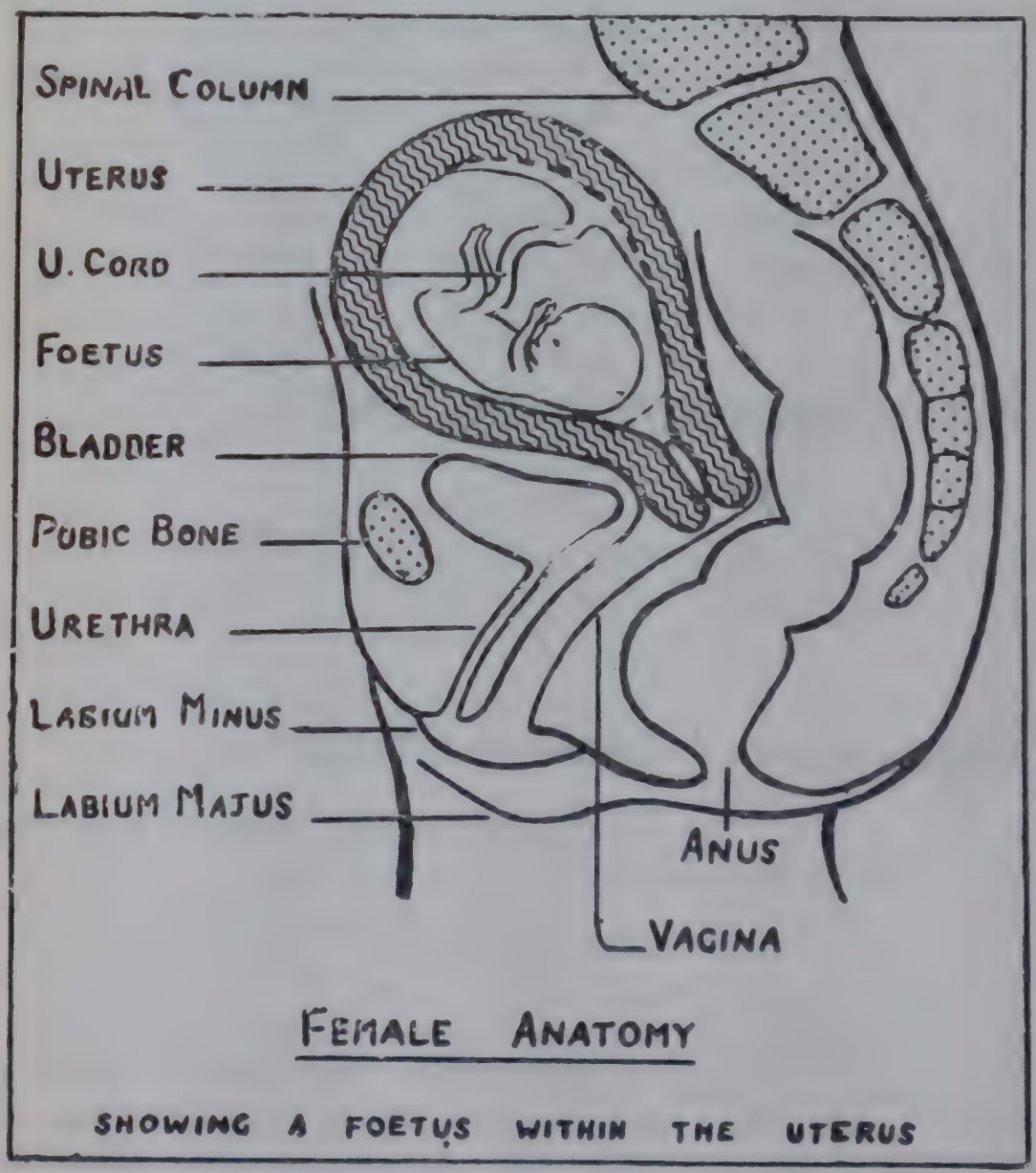
Female & Male Reproductive Systems

The female reproductive system is made up of the Uterus (or womb) and the two ovaries.

These organs lie well protected within a bony and muscular framework known as the pelvis. The uterus is a pear-shaped muscular organ with a lining (endometrium). It enlarges to hold the growing baby. Two narrow muscular tubes, the Fallopian tubes, are attached to the upper part of the uterus, one on either side. The neck of the uterus is narrow and known as the cervix. It opens into a hollow muscular tube known as the vagina. The vagina lies between the bladder and the rectum and its external opening is partly closed by the hymen, a membrane which remains intact unless penetrated at intercourse. or rarely, broken by violent exercise.

The ovaries are two almond-shaped glands which lie near the two ends of the tube. They produce a mature egg every month in a process known as "ovulation"

Usually, alternate ovaries produce one egg, which bursts out of the ovary and is grasped by the fimbrial ends of the tube, in which it moves towards the uterus.



The chain of events starting with menstruation is known as the menstrual cycle. The first day of menstruation is known as the first day of the cycle.

The menstrual cycle ends on the first day of the next menstruation when the next cycle starts.

The new born baby girl possesses about 300,000 of these egg cells, but the greater number of them will

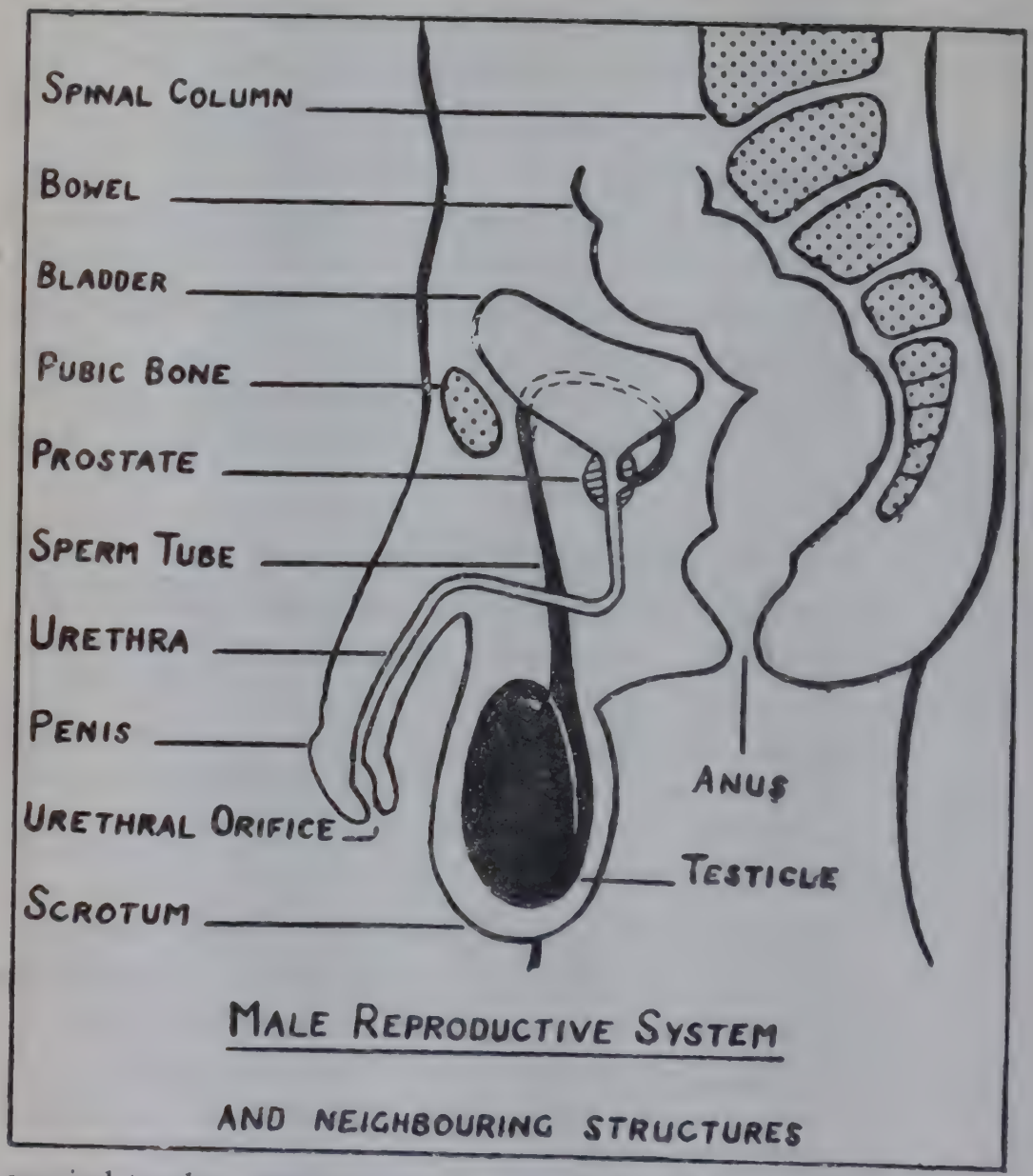
ie when puberty is reached. Only about 400 are destined to reach maturity and only a few of these will ever be fertilzed.

The egg cells or ovum develop within a follicle which secretes oestrogen. When this follicle has released the ovum it closes and heals rapidly. Within it appears a thick yellow mass called the corpus luteum or yellow body which secretes progesterone. Oestrogen is responsible for the symptoms and signs starting before ovulation (i.e. mucous secretion of the cervical glands and breast changes) and the development of the endometrium. Progesterone further affects the lining of the uterus.

Progesterone is secreted by the Corpus Luteum and its main function is to prepare the endometrium for the fertilized egg. If the egg is not fertilized, the supply of progesterone tapers off towards the end of the menstrual cycle and the endometrium disintegrates into the menstrual discharge. If fertilisation has taken place, progesterone continues to be secreted, first by the corpus luteum and then by the placenta (afterbirth).

Progesterone has one other major function in each cycle as during pregnancy, it prevents the thalamo-pituitary complex, now thought to be the master control centre of the reproductional-endocrine system, from secreting more of those hormones that would cause an ovary to discharge another fertilizable egg.

The male reproductive system consists of 2 glandular organs or testicles, which are contained in the scrotum. The testicles produce the male sex cells or sperms, which are invisible without a microscope. The penis or male organ serves to discharge the sperms. The production of sperms or spermatogenesis begins at the time of puberty and continues till the sixties or later. It is a continuous process, unlike ovulation (which occurs only once in every menstrual cycle). The sperms are stored in the testicles and at the time of intercourse they are discharged in a fluid (seminal fluid) through the hair-like tube known as the vas deferens, and are



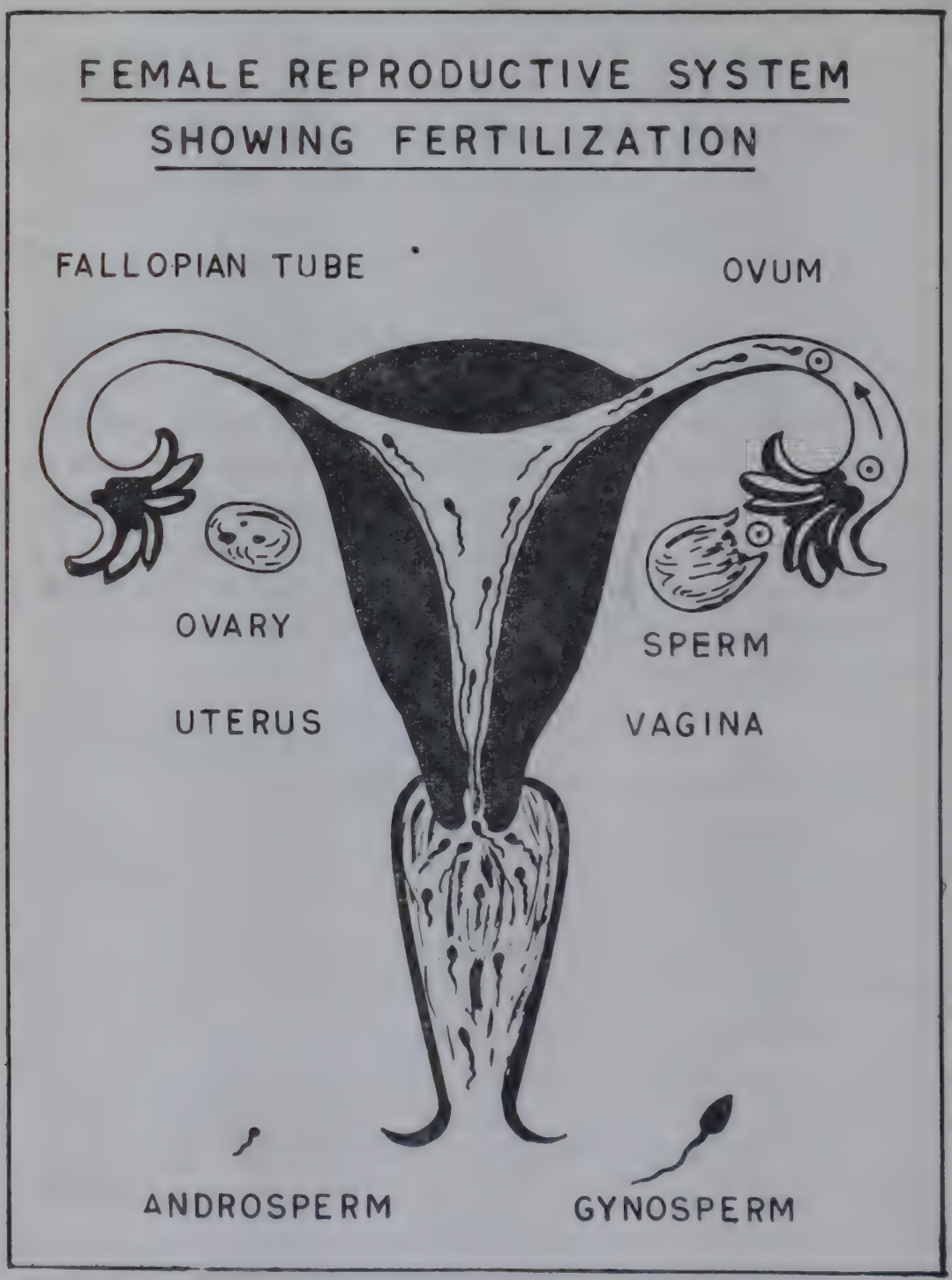
carried to the exterior by the urethra. As many as 400,000 sperms may be discharged at one emission, or in an ejaculation.

The testicles also produce the male hormone, testosterone, which is secreted into the blood stream and causes the boy to develop the secondary sex characters at puberty.

If intercourse has taken place within 72 hours of the release of the mature ovum, the ovum may then encounter the male sperm in the uterine tube. If one of the sperms fertilizes the ovum, fertilization will probably occur in the

upper part of the uterine tube. Once fertilized, the ovum becomes a single-cell zygote. Within a day or so after fertilization the zygote begins the process of cellular cleavage, first into 2 cells, then four, then eight etc. By the third day, there are an estimated 16 cells. As this cleavage is taking place, the zygote is continuously moving down the uterine tube. The individual cells formed by the ongoing cleavage are called "blastomeres". At the end of about 4 days, the combined blastomeres form the morula, which is a solid cluster of blastomeres. By the fifth day, this morula has begun to enlarge and become hollowed out, and at this point it is called a "blastocyst". It continues to enlarge and hollow out, and by about the 5th day the zygote, now fully in the blastocyst stage, reaches the uterus. By the 6th or 7th day, the zygote has begun the process of implantation into the wall of the uterus. The implantation activity then takes about 4 more days. By the 11th day implantation is completed.

From the 2nd to 5th week, with implantation, developmental changes occur in the blastocyst and this is the period of organogenesis (formation of new organs). By the 6th week a full compliment of organs is present, though still in a primitive stage. By the 7th week stimulation of the mouth or nose of the embryo will cause it to flex its neck. By the 8th week at which point the conceptus is called foetus — rather than an embryo — there is a discernable electric activity in the brain; it is possible to get an E.E.G. reading. Toes and fingers are by now clearly visible. During the 9th and 10th week, a number of reflex activities are noticeable, particularly squinting and swallowing. By the 10th week, spontaneous movement on the part of the foetus is taking place, independent of external stimulation. By the 11th week the brain structure is essentially complete and a foetal electrocardiograph through the pregnant woman can pick up heart activity. Some time between the 13th and 16th week, the woman is likely to feel foetal movements, or "quickening". Viability is possible some time between the 26th and 28th week. Birth normally occurs between the 39th and 40th week.[2]



Sex Determination

"Many of our misconceptions about sex selection through the centuries can be attributed to the fact that the human body was off limits to anatomists for hundreds of years"—as a result all kinds of conjectures regarding it existed in people's minds.

Among many peoples from Eskimos, Swedes, Bavarians to Indians, Chinese and Americans, different beliefs, superstitions, and theories influenced sexual practices in favour of having boys.

These practices are so bizarre that they sound unbelievable. Yet even today the same desire for sex selection exists, whether in the royal reigning houses or the humble huts of the Indian farmer for whom a son may mean the difference between just existing and living.

This subject of sex selection engaged the attention of even Hippocrates and Aristotle. However a real step was taken in 1841 when the "anatomist Rudolph Von Kolliker conclusively established that sperms originated within the tissue of the male testes. This discovery was quickly followed by observation in animal studies, of the actual penetration of the egg cell by the much tinier sperm cell. Later on it was discovered that the central portion or nucleus, of both egg and sperm contained only half the number of chromosomes that are present in the nucleii of all our body cells. (*See Chp 1. Pop by Age & Sex*).

No-one had ever actually seen a human egg cell undergoing fertilization by a sperm cell until the latter part of the 1940s and the early 1950s.

While the female egg is more than 1/250th inch in diameter, the main body of the sperm is a mere 1/8,000th of an inch across, and its volume is only 1/50,000 that of the egg.

During intercourse, the male ejaculates about 400 million sperm cells into the vagina. Yet only 100-200 reach the tube because of the hostile acid vaginal environment, which destroys the sensitive sperm cells.

Only the fittest sperms survive to pass through the cervix into the womb. Under the microscope as seen by Dr. Shettles, one can see the sperms making heroic efforts to gain admittance to the egg's outer core, which houses the

egg's inner sanctum, but only one penetrates the interior, tail and all. There it merges with the egg's nucleus to create a new human being. As soon as one sperm penetrates the nucleus, all others find the way to the heart of the egg blocked; some unexplained mechanism within the egg apparently releases a chemical that renders the innermost portions of the egg absolutely impregnable once it has been fertilised by a single sperm.

There are 22 pairs of Autosomes, i. e. body chromosomes and one pair of sex chromosomes in a fertilised ovum. If each of the 2 sex chromosomes are X (i.e. the one sex chromosome carried by the sperm and the one sex chromosome carried by the ovum which in any case is always X because the ovum only carries an X character chromosome) then the resulting individual will have XX sex chromosome and be a girl. But if the sperm carries the Y chromosome, the resulting individual will have XY chromosome and be a boy.

Using phase-contrasts microscopy, Dr. Shettles has described 2 distinct sizes and shapes of sperm cells. The small, round headed sperm carry the male producing Y chromosome, known as androsperm, and the larger oval-shape female producing X chromosome, known as gynosperm.

The androsperms were found to outnumber the gynosperms in most specimens of ejaculate. The reasons for this greater number of androsperms was looked for in further experiments by Dr. Shettles when he began to study the environment that exists inside the vagina and uterus at about the time of conception. He took capillary tubes and filled them with cervical and vaginal secretions. Then he turned millions of sperms loose at the opening of the tubes and watched their activity through his microscope. When the secretions in the tubes were more acidic than alkaline, the gynosperms seemed to prevail, their greater bulk seemed to protect them from the acid for much longer periods than were the androsperms. But when the tubes were filled with cervical mucus that had been removed from a woman very close to the

time of ovulation, the smaller androsperms were more prevalent, because of the highly alkaline environment that favours the androsperms. Acid inhibits both gynosperms and androsperms but is more harmful to the androsperms. Alkaline secretions are kind to both types of sperm and generally enhance the chances of fertilisation. That is why a woman's body secretions become increasingly alkaline as the moment of ovulation approaches. In the absence of hostile acids the androsperms are able to use the one advantage they have over their sisters; the speed and agility that their small compact heads and long tails give them. The environment, within the cervix and uterus is generally alkaline, while that of vagina is generally acidic. This data together with other data of continence, timing of intercourse etc. enabled Shettles to draw up two procedures, one for female offspring, and one for male offspring.[3]

Some workers in other countries have been also working on sex determination and much is still to be done in this field. It is significant however that the importance of having a male child is not confined to developing countries where it is of high priority for religious and economic reasons. Research should be undertaken in these countries.

SEXUALITY

Human Sexuality

Human Sexuality is a privileged mode of an intimate interpersonal relationship between a man and a woman. This expression is multi-faceted with physical and emotional facets predominating over cultural, intellectual and social facets. Ideally, this relationship is a partnership for mutual fulfilment.

The sexual instinct with which humans are endowed is second only to the instinct of self-preservation. It is creative in character and is expressed best by both man and woman in a mature and committed relationship such as marriage.

Physically, emotionally, mentally and psychologically, sexuality gives human beings the characteristics of a person as male or female. Certain qualities are said to be more masculine, and others more feminine. Sexuality is a factor that enters into most human relations. Sexism is the accentuation of sexual differences and it often leads to an unjust discrimination based on sex.

Sexism in its extreme form dehumanizes both man and woman. It prevents the relationship between them being one of real partnership.

The relationships of the sexes are also involved in the vast changes that are sweeping the world today. Several issues are being opened up in the process. Many, particularly the young, seek meaningful guidelines concerning them. It is important that such orientations be on the basis of the recognition of sexuality as a positive value.

The Sexual Act and its Meaning

As long as the Christian tradition was constrained by its negative attitude to instinctual pleasure and the exclusive preoccupation with sexual intercourse and procreation, it could not give full weight to the relational aspect of marriage which is initiated, consumated and maintained in a powerful way by sexual intercourse.

The idea of marriage essentially as a *relationship* may come as a surprise after hundreds of years of examining it as a contract, but no other word fits more accurately the scriptural and human facts; and the council calls it a *community of love* and a conjugal covenant.

The *first human community of love is the bond between mother and child*, the basic human attachment of intimacy and oneness which is the basis and foundation of all other one-to-one relationships. This bond is present in many animal species but only in man is it nurtured over such a long period.

Basically the areas of attachment are *instinctual.* The child learns to attach itself to the mother through sound by hearing and recognizing the sounds mother makes; *vision*, by recognizing her face, and later on the whole body; and *touch*, feeling and touching and holding on to her. The mother reciprocates by holding her child, responding to its cry, its sounds and appearance. All human bonds thereafter depend on these sensory and perceptional characteristics. The mother-child and father-child bond deepens so that within the first six months separation between mother and child for any undue time produces intense anxiety and grief which remains the mark of all separation and

intimate relationships. The satisfaction of physical presence, reinforced by oral gratification, resumes the most specific shape when the child learns to feel recognized, wanted and appreciated, in short—loved by the mother and then by the father.

In order for these characteristics to grow, it needs the continuity, security, reliability and predictability of a permanent relationship between itself and the parents and it is within this permanency that growth and healing takes place.

Marriage is the second and only other exclusively intimate relationship which repeats all the fundamental characteristics of the first. This one–to-one relationship needs continuity, security, reliability and predictability in order to sustain the relationship and allow within it further growth, healing and development of the couple. In order for this to be achieved, what is needed is a sustaining relationship which gives the couple uninterruptedly the sense of being recognized, wanted, appreciated, in short being loved by the only significant other who is the spouse.

It is the sexual act that has within it the capacity to achieve most economically and beget most fully in the human measure, of the recurrent renewal of love whereby " two people continue to feel the most significant persons to each other and through this unconditional recognition and acceptance, renew their own sense of importance and self-esteem as human beings[2]

There are semblances of such relationships among lower animals. We find it particularly in females of those species in which the young are born while still incapable of securing food and protecting themselves from environmental danger. However, experimental use of sex hormones has shown that short-lived maternal behaviour of this kind in lower animals is somatic —i.e it arises from changes in reproductive body tissues and is of quite a different order of function from that of love which is found only in human beings. We hear too, of long-term restrictions of copulation to the same partner in such disparate species as wolves and snakes. Zoologists in general doubt the actuality of this, except as an occasional atypical variance.

Love is now recognised to be a part of the human sex instinct equal to the coital impulse in psychological significance. And, to durable love of mate as a peculiarly human quality is added prolonged interest in the young.

To me, this tripartite sex instinct which can find complete satisfaction only by experience of all three inseparable components—copulation, love of mate, love of young — explains the near university of monogamy.

The pragmatic value to society of a family structure made up of one man, one woman, and their children has, I think, misled many scholars to attribute it to economics or religion. I see it as but a part of *natural law*. In the cultural evolution of society, man's experience has revealed monogamy as the one best way for man and woman to express their God-given sexual nature. Love for the sexual partner immeasurably adds to the ecstasy of coitus; mutual enjoyment of intercourse inevitably strengthens love; common affection for children, and partnership in rearing them to sturdy enlightened adulthood.

Because of the enhancement of our basic animal sex nature by its integration with our spirituality, human sex relations without love becomes inadequate for full satisfaction, and love without coitus at mutually agreeable intervals becomes frustrating and ultimately demoralizing. Love fused by coitus, but without children to bring up, lacks completion; but when it brings more children than can be properly cared for, it is dangerously strained, even distorted.

In their nature, parents will so order their reciprocal sex actions that the love which motivates these actions will be strengthened by them. The normal fulfilment of such sexuality will be children, in number no fewer, and certainly no more, than can be brought up to become, for their parents, stalwart replacements in the endless human struggle towards their divine ends. To enable them to adjust completely to their intrinsic human sex-nature, many parents, the world over, will need competent medical and spiritual counselling. To mates of low fertility there should be available appropriate professional remedial services; to those whose uncontrolled reproductivity

would destroy the balance among the components of their sexuality (coital urge, love of mate, love of young), there should be available suppressive means and methods appropriate to their particular capabilities and conditions — religious, social, educational, and so forth. [3]

Studies of the sexual behaviour of human males and females invariably reveal the often "profound emotional components that made of the former affectionate, protective husbands and fathers, and of the latter, devoted wives and mothers. These deep and directive emotions were obviously not just adjuncts but integral parts of the human sex instinct. Every language throughout the world has a collective name for it: ours is "love". It is not dependent on culture or purposeful planning by the intellect. It is found by observant scientists throughout history, in lands near and remote, in peoples of all colours and degrees of culture. They find that this effective factor not only brings together mutually agreeable coital partners but makes of them long-term, even lifelong, mates, who joined in various social patterns become nurturing parents. Of such, is the family made – out of this peculiarly human incorporation of spiritual love with the basic copulatory instinct.

Sexual Discipline

"The idea of discipline is nowadays almost automatically coupled with neurosis and aggression. Psychological studies however show that conscious self-control, is coupled with individual responsibility, cannot cause neurosis and is even an important factor for the growth and maintainence of a sound personality".

Unwin gives criteria for the degree of organization of each society, next to criteria for the degree of sexual limitation which the society has adopted. All societies with a certain degree of organization accept a corresponding degree of sexual limitation and vice versa.

A higher degree of organization is the outward manifestation of the presence of more social energy, and at the

same time the sole objective evidence of the presence of more mental energy. It is supposed that the potential power of thought is inherent to man and roughly the same in all human societies. But the actual possibility of using this inherent power of thought depends on the available amount of mental energy. This amount of energy varies from one society to another. The increase of the amount of mental energy (increased actual power of thought) and of the amount of social energy (higher degree of social organization) are caused by the operation of one single factor. This factor is increasing continence, or the reduction of sexual opportunity.

A change in this factor is not immediately manifested in a different degree of social organization. There is an *inertia-factor* in the dimension of time, which causes the full effect of the change to become completely manifest after a hundred years (three generations late) the psychological explanation for this phenomenon is that human behaviour is for a large part conditioned by the unconscious, which itself is largely formed by the education and the experiences of the first years of life. Therefore it is the third generation, brought up from the earliest childhood in a community, where the new sexual limitations have become completely common property, that will give the most faithful expression of the degree of social organization that corresponds with the new level of sexual discipline.

A second complication of increasing sexual limitation is the fact that in the higher organized societies the social structure becomes layered (*class formation*), the sexual limitations being unequal for the different layers of society. The higher the society has risen in the cultural scale, the smaller is the proportion of those who have reached the highest cultural heights, although it is this small minority by whose behaviour we assess its cultural state.

Both these complications, inertia factor and class formation, come most strikingly to expression in the descriptions of the so-called civilisations, the most energetic societies in history, which form the material for the second part of Unwin's study. "In each case (each af these civilizations) they reduced their sexual opportunity to a

minimum by the adoption of absolute monogamy; in each case the ensuing compulsory continence produced great social energy. The group within the society which suffered the greatest continence displayed the greatest energy, and dominated the society. When absolute monogamy was preserved only for a short time, the energy was only expansive (ie. manifesting itself in conquest and colonization) but when the rigorous tradition was inherited by a number of generations the energy became productive (ie. manifesting itself in scientific, artistic, and spiritual growth). As soon as the institution of modified monogamy, that is, marriage and divorce by mutual consent, became part of the inherited tradition of a complete new generation, the energy, either of the whole society or of a group within the society, decreased and then disappeared."

Surveying the whole history of mankind or "the cultural process," it can by no means be represented, according to Unwin, as an ascending straight line like "the biological process" (the history of life on earth). We see no constant growth from "primitive man" toward 20th. century "civilization", but many lines side by side, rising and falling. Continually different societies have occupied different positions in the cultural scale at different times. The factors that always, without exception, have accompanied this unequal development in equal frequency, duration and intensity, though proceding it with a time interval of 3 generations, is the degree of *sexual discipline.* Is there a causal relationship? Unwin concludes there is, after careful consideration of the evidence: "I submit, therefore, that the limitations of the sexual opportunity must be regarded as the cause of cultural advance."

Pitirim Sorokin (American of Russian descent, described as one of the pioneers of analytical sociology) comes to the same conclusions as Unwin. In his book " The American Sex Revolution" he formulates two psychological laws:

1. "The regime that confines sexual life within socially sanctioned marriage, and that morally disapproves and legally prohibits premarital and extra-marital relations provides an enviroment more favourable for creative growth of society than the regime of free or disorderly sex relationships which neither morally disapproves nor legally prohibits premarital and extra-marital liaisons."

2. "The regime that permits chronically excessive, elicit, and disorderly sex activities, contributes to the decline of cultural creativity."

Among extensive evidence which Unwin studied he reiterates further that among civilised societies those which have remained strict in their sexual codes for the longest period have reached the highest levels.

Among other benefits he considers the greatest significance of life-long monogamous marriage lies, in the transformation of the partners themselves. *Their individul egos merge. They learn to accept and supplement each other, and through the steady growth of mutual love and care, in unconditional loyalty, their best creative impulses are released and developed, creating the most suitable climate for the growth of the children.*

"In contrast to marriage, illicit sex relations cannot and do not fulfil these tasks. Each partner remains a mere sex apparatus for the satisfaction of the lust of the other. Their "I's" are not merged into one "we", nor is their selfishness tempered by mutual devotion and love.....Children are not desired."

"This revolutionary childlessness....is a symptom of a progressive decline of" parental instinct." If this strongest fountainhead of interhuman sympathy and loving care is drying up, most of the other forms of interhuman solidarity will also wither away."

"If the marriage/family school" fails to graduate socially well-adjusted, mature individuals—there seems to be no other agency which can better discharge this task—the nation and mankind at large are bound to be made up more and more of

individuals and groups less and less capable of getting along with others".

Unwin then quotes the thesis of Sigmund Freud that led Unwin to his extensive enquiry." We believe that civilization has been built up by sacrifice in gratification of the primitive impulses, and that it is to a great extent for ever being created as each individual repeats the sacrifice of his instinctive pleasures for the common good. The sexual are among the most important of the instinctive forces thus utilized; they are in this way sublimated. .....Society cannot think of a greater danger to her civilization than would befall her if the sexual impulses were freed and allowed to pursue their original goal".

Dunning disproves a contention of Freud that civilization, repression, and neurosis are inevitably associated in such a way that the more civilisation, the more neurosis and conversely the less repression, the less neurosis and the less civilization. He feels that Freud's first idea of sacrifice of sexual impulses was not received well by society because of this contention.

According to Freud the sexual drives possess an extraordinary plasticity, ie. they have a great capacity to exchange intensity, aim and object among each other, or to accept substitutes for their original aim if this is less easily obtainable. Sublimation is the name for this process; if the drive gives up its original sexual aim and accepts an aim which is called social, no longer sexual itself but genetically associated with the original aim. This plasticity of the libido and the capacity of sublimation however differs widely from individual to individual.

Dunning further concludes that sublimation next to being an indispensable factor for the building and maintainence of civilization, is apparently a neurosis-preventing factor, but that the capacity for it develops unequally in different individuals.

In Freud's terminology the word "sex" is used in a very broad sense, even including the desire for research and knowledge, friendships, pleasure in work etc. which are substitutes for the sexual aim. They are sublimated drives, still

sexual themselves, though their aims or objects are sexual no longer.

According to Dr. Garl Custave Jung, what Freud calls sublimation, is not a conscious process that can be achieved at will, but is an accomplishement of the whole personality, both conscious and unconscious. The unconscious, (being a store of unconscious knowledge, intuition, wisdom and the collective unconscious) can guide the conscious mind to find its own destiny. Jung calls this the "*Individuation process*", aimed at the realization of the personality as it was connived in the first embryonic nucleus.

The view of the process called *Sublimation* approaches very closely the sociological terminology of Sorokin called "*re-direction*" which can be strongly enhanced by (1) strengthening of the motivating power of the social-spiritual values of society, which means that society itself must have a clear, comprehensible, inspiring purpose, and by (2) a well-developed personal responsibility towards society, which makes it easy to dismiss the instinctive impulses, not by fear but by free conviction, looking at this dismissal not as a lost opportunity of satisfaction, but as a valuable gain both in personal maturity and in helping create the right kind of world society.

Detached from the notion of being a sublimated sexual drive, as Freud described it, love comes out in Terrume's view as the great life-giving force, necessary for as sound development of personality.

Love is a manifestation of the whole person, both spiritual and sensory, expressing the fact that some other person is valued by him. Love and sex are two notions, completely distinct from each other. Love can be expressed on the sexual-level, but both can proceed independently from the other, and often real love may require sexual continence.

The recognition of ones own value, the realization that one is needed by others which Terrume calls the "confirmation by love" is seen by her to be an indispensable factor for the physical growth of a person, and the basis or his

consciousness. Lack of this confirmation causes the disease, self-called by her "frustration neurosis." [4]

Fecundity

Fecundity or the ability to bear a child is "distinguished by almost universal awareness of the connection between sexual activity on the one hand and the birth of children on the other." This reproductive behaviour of humans in contrast to that of other animals has not received the attention of psychologists or behavioural scientists as one would imagine it should in the present world situation."

While results of the process of reproduction show little change over the centuries, the circumstances surrounding it and even determining it have been considerably altered in present times.

Several fundamental questions confront us in the study of motivations for childbearing :

1. In the origin and development of motives for childbearing, what are the relative influences of : early sexual urges and sexual development; childhood and adolescent sex-role socialization; adolescent and adult peer group influences; husband/ wife role relationships; situational and economic factors in marriage?
2. What are the distinctive differences between male and female motivations for parenthood? Do motivations vary with different degrees of cross-sex identification?
3. How do changes in social conditions feed back into changes in motivation for marriage and childbearing ? What are the differences between motivations for childbearing in general (first child) and motivation decisions affecting family size (additional children) ? What is the interaction among motivations for childbearing, sex of child, and sex of parent? How powerful are beliefs about the benefits to children of having siblings in determining family size?

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4. What is the relationship among hormonal states, physical excitation, and experiential factors in sexual arousals and sexual behaviour? How are resistances to contraception related to sexual drives and fears? What kinds of psychological threats are posed by IUDs, abortion, sterilization?
5. Can the concept of ambivalence, which is obviously relavent to marriage and childbearing, be shaped to practical use? Are there means to tip the balance in childbearing decisions by raising the avoidance gradient or by providing alternative escape routes?
6. How powerful are female role expectations in determining the decision to have a first child?
7. What are the potential effects on male and female roles of separating sex from procreation, through contraception and abortion? [5]

The Evolution of a Woman as Childbearer

It is inconceiveable that millions of years of evolutionary selection during a period of a marked sexual division of labour have not left pronounced traces on the innate character of men and women. Aggressiveness and mechanical and spatial skills, a sense of direction, and physical strength - all masculine characteristics - are the qualities essential for a hunter; even food gatherers need these same qualities for defence and exploration. The prolonged period of dependence of human children, the difficulty of carrying the peculiarly heavy and inert human baby - a much heavier and clumsier burden than the monkey infant and much less able to cling on for safety - meant that women could not both look after their children and be hunters and explorers.

Early humans learned to take advantage of this period of dependence to transmit rules, knowledge and skills to their offspring–women needed to develop verbal skills, a talent for personal relationships, and a predilection for nurturing, going even beyond the maternal instinct. The survival of the core of these qualities in the form of specifically female innate characteristics can easily be seen in women's everyday behaviour.

It would be futile to attempt to fit women into a masculine pattern of attitudes, skills and abilities, and disastrous to force them to suppress their specifically female characteristics and abilities by keeping up the pretence that there are no differences between the sexes. These differences should be recognised and society's activities moulded in a way that makes full use of both male and female activities.

It is ironic that as society's economic base shifts away from manufacturers and towards services, creating a much greater need for distinctively female personal skills, there should be such a clamour for women to acquire the talents of a manufacturing society. Women have a greater complexity and competence in thought, feeling and observation in relation to people, a more protective and less belligerent attitude to the world and a distinctive interest in personal relationships rather than objects. All these are qualities uniquely suited to the needs of the emerging service to society.

There is no doubt that the conception of the man-woman relationship in marriage has never been so complex or ambitious. When marriage is merely the state of not being divorced and when most pleasures - sexual and mental-are sought outside it, it is hardly surprising that, legally, marriage failures are few. When, however, the expectation is that marriage will meet all the personality needs of the two partners-and the establishment of a home and the bringing up of children are only a part of these needs - then a greater number of marriage failures is one of the inevitable results of a much richer, infinitely more fulfilling and indisputably harder concept.

The creativity of maternity and the joys of motherhood have been dwelt on so strongly and for so long that it is difficult to discuss them without blundering into somebody else's cliches.

The familiarity of motherhood has helped the Womens, Libbers in their campaign to label it a mundane experience. But bearing and giving birth to a child is an experience not comparable to any other.

At no other time is a human being so near to creation, so near to affirming life and glimpsing immortality. It is a long way away from Kate Millets' phrase that a woman is "...simply by virtue of her anatomy...prevented from being a free human being."

Do women really see motherhood in this way? Or does it provide a role which largely releases them from the existential anxieties of today; from the persuasive problems of meaninglessness that increasingly over-ride the problem of frustration? What am I here for? What is it that I want out of life? How can I use my freedom? The woman has an answer in her baby. The existence of this answer does not preclude the search for alternatives — it does not preclude involvement in a job, a career, a life outside the home. It simply provides one answer that is not and could never be available to men.[6]

Pregnancy is a major event in the life of a woman. It is a biological event of the first order, since important changes take place in her body at the hidden level of hormone and uterine changes and at the visible level of a change in weight and appearance.

Pregnancy is a psychological event of the first order as well. It will affect a woman's attitude toward herself, toward her body, toward her husband and toward her other children. The attitude of a woman's friends and relatives will influence her response to the event. It can also be called a cultural event, since by producing a child or by the possibility of producing a child, a woman is placed in the position of contributing to the procreation of the species and thus relating herself to the broadest biological current in society.

Pregnancy, then raises for a woman the question of her nature as a woman; her potential role as a mother; her relationship to the whole of society and, most important perhaps, her situation as a person in the world. For all these reasons it is not extreme to say, with Joseph C. Rheingold, that "pregnancy is a crisis."

Pregnancy is a maturational crisis as is puberty and menopause and requires the woman to adjust to the new state

of her body. She has to bring it back into equilibrium, as a great variety of emotional, mental and physical responses are produced by each of these three states.

How a woman passes through this crisis depends upon the biological conditions of her pregnancy, which vary from woman to woman, and upon the whole social, psychological and cultural context of her past, present and projected future life.

The treatment of the pregnant woman depends chiefly upon the value that society ascribes to the blessing of children ; this value varies at various periods and in different countries. National, political and economic interests as well as ethics and constitutional law play their part here....The psychological experience of pregnancy to a large extent depends upon the conditions under which the woman has conceived and in which the expected child is born. The social fears of the unmarried woman encompasses the psychologically determined normal or neurotic fears. Economic difficulties and illnesses and death in the family may play their part. In brief, environmental factors, direct and indirect, certainly have an effect on the course of the reproductive process.[7]

The Value of Children

Why then do people want children ? It is a simple question to ask, perhaps an impossible one to answer.

Throughout most of human history, the question never seemed to need a reply. These years, however, the question has a new tone. It is being asked in a nonrhetorical way because of three revolutions in thought and behaviour that characterize the latter decades of the twentieth century : **the vital revolution** which lower death rates have given rise to " the population problem " and raised new issues about human fertility ; **the sexual revolution** which sex is being liberalised, secularised, and divorced from reproduction ; and the **woman's revolution** in which childbearing and rearing is no longer being accepted as the only or even the primary role of half the human race. Accordingly, for about the first time, the question of why people want children can now be asked, so to speak, with a straight face.

Taxonomy

The Biological

Do people innately want children for some builtin reason of psychology? Is there anything to maternal instinct, or parental instinct? Or is biology satisfied with the sex instinct as the way to assure continuity?

In psychoanalytic thought there is talk of the "child-wish", the "instinctual drive of psychological cause", "the innate femaleness of the girl direct(ing) her development toward motherhood," and the wanting of children as "the essence of her self-realization," indicating normality. From the experimental literature, there is some evidence that man, like other animals, is innately attracted to the quality of "babyishness". In man, as in other animals, social prescriptions and customs are not the sole or primary factors that guarantee the rearing and protection of babies. This seems to indicate that the biologically rooted releaser of babyishness may have promoted infant care in primitive man before societies were ever formed, just as it appears to do in many animal species. Thus this releaser may have a high survival value for the species of man.

In the human species the question of social and personal motivation destinctively arises, but that does not necessarily mean that the biology is completely obliterated. In animals the instinct to reproduce appears to be all; in humans is it something?

The Cultural

Whatever the biological answer, people do not want all the children they can physically have – no society, hardly any woman. Elsewhere social traditions and social pressures enforce a certain conformity to the approved childbearing pattern whether large numbers of children in Africa or small numbers in Eastern Europe. People want children because that is "the thing to do" – culturally sanctioned and institutionally supported, hence about as "natural" as any social behaviour can be.

Such social expectations, expressed by everyone toward every one, are extremely strong in influencing behaviour even on such an important element in life as childbearing, and whether the out-come is two children or six. In most human societies, the thing to do gets done, for social rewards and punishments are among the most powerful. Whether they produce lots of children or few and whether the matter is fully conscious or not, the cultural norms are all the more effective if, as often, they are rationalized as the will of God or the hand of fate.

The Political

In a way, the human responsibility to perpetuate the species is the grandest such expression - the human family pitted politically against fauna and flora - and there may always be people who partly rationalize their own childbearing as a contribution to that lofty end. Beneath that, however, there are political units for whom collective childbearing is or has been explicitly encouraged as a "demographic duty". In ancient Rome, according to the Oxford Dictionary, the proletariat - from the root proles, for progeny - were " the lowest class of the community, regarded as contributing nothing to the state but offspring": and a proletariat was " one who served the state not with his offspring," The world has changed since then, but not all the way.

The Familial

In some societies people want children for what might be called familial reasons : to extend the family line or the family name, to propitiate the ancestors, to enable the proper functioning of religious rituals involving the family (eg. the Hindu son needed to light the father's funeral pyre, the Jewish son needed to say Kaddish for the dead father). Such reasons may seem thin in the modern secularized society but they have been and are powerful indeed in other places.

In addition, one class of family reasons shares a border with the category below, namely, having children in order to maintain or improve a marriage : to hold the husband or

occupy the wife, to repair or rejuvenate the marriage, to increase the number of children on the assumption that family happiness lies that way. The point is underlined by its converse; in some societies the failure to bear children (or males) is a threat to the marriage and a ready cause for divorce.

Beyond all that is the profound significance of children to the very institution of the family itself. To many people, husband and wife alone do not seem a proper family — they need children to enrich the circle, to validate its family character, to gather the redemptive influence of offspring. Children need the family, but the family seem also to need children, as the social institution uniquely available, at least in principle, for security, comfort, assurance, and direction in a changing, often hostile, world. To most people such a home base, in the literal sense, needs more than one other person for sustenance, and in generational extensions.

The Personal.

Up to here the reasons for wanting children primarily refer to instrumental benefits. Now we come to a variety of reasons for wanting children that are supposed to bring direct personal benefits.

Personal Power. As noted, having children sometimes gives one parent power over the other. More than that, it gives the parents power over the child(ren) — in many cases, perhaps most, about as much effective power as they will ever have the opportunity of exercising on an individual basis. They are looked up to by the child(ren), literally and figuratively, and rarely does that happen otherwise. Beyond that, having children is involved in a wider circle of power.

Personal Competence. Becoming a parent demonstrates competence in an essential human role. Men and women who are closed off from other demonstrations of competence, through lack of talent or educational opportunity or social status, still have this central one. For males parenthood is thought to show virility, potency, machismo. For females it demonstrates fecundity, itself so critical to an acceptable life in many societies.

Personal Status Everywhere parenthood confers status. It is an accomplishment open to all, or virtually all, and realized by the overwhelming majority of adult human kind. Indeed, achieving parenthood must surely be one of the two most significant events in one's life — that and being born in the first place. In many societies, then and only then is one considered a " real man " or a " real woman ".

Childbearing is one of the few ways in which the poor can compete with the rich. Life cannot make the poor man prosperous in material goods and services but it can easily make him " rich with children ". He cannot have as much of anything else worth having, except sex, which itself typically means children in such societies. Even so, the poor are still deprived by the arithmetic: they have only two or three times as many children as the rich whereas the rich have at least forty times the income of the poor.

Personal Extension. Beyond the family line, wanting children is a way to reach for personal immortality — for most people, the only way available. It is a way to extend oneself indefinitely into the future. And short of that, there is simply the physical and psychological extension of oneself in the children, here and now — a kind of narcissism: there they are and they are mine (or like me)

> Look in thy glass and tell the face thou viewest,
> Now is the time that face should form another;...
> But if thou live, remembered not to be,
> Die single, and thine image dies with thee.
>
> — Shakespeare's Sonnets, III

Personal Experience. Among all the activities of life, parenthood is a unique experience. It is a part of life, of personal growth, that simply cannot be experienced in any other way, and hence is literally an indispensable element of the " full life ". The experience has many profound facets: the deep curiosity as to how the child will turn out, the renewal of self in " the second chance," the re-living of one's own childhood, the redemptive opportunity, the challenge to shape another human

being, the sheer creativity and self-realization involved. For a large proportion of the world's women, there was and probably still is nothing else for the grown female to do with her time and energy, as society defines her role. And for many women, it may be the most emotional and spiritual experience they will ever have, and perhaps the most gratifying as well.

Personal Pleasure

Last, but one hopes not least, in the list of reasons for wanting children is the altruistic pleasure of having them, caring for them, watching them grow, shaping them, being with them, enjoying them. This reason comes last on the list but it is typically the first one mentioned to the casual enquiry: "Because I like children." Even this reason has its dark side, as with parents who "live through their children", often to the latter's distaste and disadvantage. But that should not obscure a fundamental reason for wanting children: love.

Man has come a long way in a short time in his evaluation of children: from non-appreciation of childhood, through innocent primitive and social cause, to obsession and problem. Many have remarked on our own "child-centred society," our "cult of children" yet even that may now be changing in response to the three revolutions. In the end, we may need to rely on those old standbys, rationality and responsibility: not everyone is equally talented to be a parent any more than a pianist or a mathematician or a tennis player, though the parental talent may not be as rare as those; and concern is owed the developmental possibilities for the individual child beyond the parental or social gratifications. If a society has full information on personal and collective consequences of childbearing, full opportunity to control fertility and thus divorce reproduction from sexuality, productive alternatives for women, no undue social pressures in regard to marriage or parenthood, and genuine concern for the produced child, that is about the best we can do.

The currency is not debased, though modern conditions affect both numbers and values. For whatever else it

is, wanting children remains a restart for man, and for individual men, another chance to try for the "good life", a revitalisation in both the literal and the symbolic sense.

Wordsworth wrote :—

> "A child, more than all other gifts
> That earth can offer to declining man,
> Brings hope with it, and forward-looking thoughts,"[8]

POPULATION CONTROL

Population control can be achieved through several ways. It may be achieved directly or indirectly. It may be achieved by one or a combination of several methods.

It may be implemented in societal controls or legalized and enforced. However, it is now widely accepted that since population control is mainly achieved through the control of births, and thus finally rests on the decisions of the individual couples, it is these couples who must be reached and motivated to make decisions regarding their reproductive behaviour.

Since the number of such 'target' couples in India is about 100 million, the task of Family Plannlng programmes through or by another method, is a formidable one.

Population control can be effected by :

1. Contraception for birth prevention.
2. Social legislation decreasing the reproductive period of a woman, such as by raising the age at marriage.

3. Encouragement of a 'small family size' by reducing the number of wanted children, for the fact is--

"that high fertility norms prevailed because they were rational : they were intelligible orientations of means towards ends, given particular conditions. These conditions were high mortality and the family farm as the basis of productive organisation. In such circumstances, high fertility was mandatory from the standpoint of the leaders of this kinship group."

In the practical affairs of life, where human labour was the principal souce of energy, children were necessary as helpers in the field, as defenders against attacking tribes and as sources of security in their parents' later years. Children were raised frugally and put to work early. From the viewpoint of the family, they were essential productive assests.

The post industrial world reinforces the behaviour of people who voluntarily limit the number of their offspring: children are no longer an economic necessity, or even an asset ; individuals rather than families are the unit of economic activity ; wealth can be accumulated : when parents are able to acquire a modicum of wealth and economic security, either actually or potentially through education, fewer children will each have a greater share of this wealth and can be better prepared to improve their own lives further.

More recently, observations of the continued decline in birth rates in such countries as Japan and Singapore suggest that similar circumstances are now inducing people to control fertility in these countries. What characterizes these countries is a process of social change, involving industrialization, urbanization and increasing opportunities for individuals to live better and to affect their future by their own actions : all are factors that not only have changed the human and physical environment, but make it increasingly visible to people, that circumstances have changed.

Varied Responses to Perceived Population Pressure

Even in industrial societies, however, voluntary fertility control is found among certain classes of people only : those who create and experience an environment in which they feel that they have the ability to control their lives. The poor have not acquired wealth and security, nor do they share the educational opportunities of the rich. There is not much to share among the children of the disadvantaged, so that the number of children does not make much difference. Poor parents do not believe that their children will be better off than they are and society does not give them much hope that improvements can be brought about by their own actions.

Similarly, in the developing countries, the proportion of the population that has been able to create and experience an environment where wealth can be accumulated and individual initiative can increase economic security and physical health, is as yet very small. There is for the most part, no advantage in smaller families and the advantage or even disadvantage of having fewer children is not very obvious.

Culture Determines Ability to Initiate Change

Communities vary widely in the extent to which they allow individuals to experiment with new behaviour. In what has losely been called the Western World, values are different from those in most traditional societies. Because each individual is thought of as an independent unit of society with a large responsibility for his own development and satisfaction and presumably a considerable control of his destiny, it is not surprizing that the Western World man has been able to accept change as something desirable.

In a modern society, individuals obey their conscience, some inner voice that assures them that they are right, even though they may receive minimal reassurances from their society.

This does not mean that individuals need no approval at least from some of their peers. Modern society

however has become so complex that there is not just one community that a man belongs to ; a he has choice — Multiple group membership which characterizes modern society is one of the reasons why change can continue in all directions : there is a great variety of life styles and values and almost any behaviour can find approval from one group or another. This situation does not exist in more homogeneous traditional societies. Thus, possibilities for change as well as reasons why one might want to change reproductive behaviour vary widely and they vary perhaps least because of individual differences. Communities determine different degrees of awareness of why a reduction of fertility might be good : an awareness that is a function of a number of factors unique to that community.

And finally, people have different capacities for initiating change, dependent for the most part on the extent to which societies allow them to be different.

Reinforcement of Behaviour Change

People are certainly not incapable of changing behaviour. Social change however, in all its ramifications of changing of behaviour, changing social structure and changing values, is a response not to a plan and a new response to altered circumstances must receive some confirmation of its appropriateness.

The few women who experiment with contraceptives receive few signs that what they do is right and the signs are ambiguous.

What encouragement the women get probably comes from the medical personnel and that is ambiguous at best. Since they have to go to a clinic, a medical service, to obtain contraceptives, there is the suggestion somehow that preventing pregnancies has something to do with sickness. This perception is further strengthened because the clinic requires a physical examination and regular scheduled follow-up visits, so that doubt is sown about the safety of contraceptives.

The only reinforcement the few contraceptives receive is probably the very personal sense of relief in not having

to bear another child: important as a very personal award although perhaps social or even immoral in the context of the culture. In traditional societies, personal satisfaction is often considered less important than approval by others.

Those who work in Family Planning programmes often place great emphasis on preventing of pregnancies as a means of controlling population. Population however is astatistical concept that cannot easily be experienced : to parents, the number of children they have is an immediate reality, but population control or population increase is not.

Moreover, if preventing a pregnancy requires a doctor, a prescription, and a close follow-up, it must be rather unsafe, not very healthy : something utterly beyond lay competence to understand and wholeheartedly accept.

Support for a new behaviour need not come from the community of course ; it can be provided, as in the examples given by persons outside the community. Often such encouragement has less validity, however because outsiders do not share the values of the community and sometimes do not understand them. Reinforcement of behaviour change must be real, it must be meaningful.

Meaningful reinforcement can be found within one's self, it need not be external. The woman who uses contraceptives because she has realized that many closely spaced pregnancies have sapped her strength, will be almost immediately rewarded when she gains time to regain her health. One can almost say that her reward is physiological.

Nor does reinforcement need to be in terms of immediate rewards. The woman who controls her fertility for the sake of the economic wellbeing of her family and the future wellbeing of her children, must be satisfied with a much less immediate reward. Such delayed reward, however can be experienced as valuable if there are other psychological reinforcements of her behaviour. Indeed many women practice contraception contentedly with only the expectation that such behaviour will be rewarded in the future, because her reward lies in her satisfaction that the future will prove her right.

It is probably realistic to consider the present time as a period of severe imbalances that are in the process of being resolved. The spontaneous emergence of patterns of fertility control is an example to responses to perceived needs. These needs are a function of the unique environment: the response-adaptive behaviour must find some positive reinforcement from the environment.

Circumstances that led some people to change their reproductive behaviour are not duplicated everywhere; removing barriers does not automatically result in spontaneous changes when the reasons for change are not present. The availability of contraceptive services does not motivate people to use them, although it facilitates new reproductive behaviour when people seek to change.

Experience everywhere has shown that for motivated women to use modern contraceptives is not particularly difficult. Even motivated women, however, must receive encouragement of contraceptive behaviour if they are to continue and continue successfully.

Interrelation of Population Dynamics & Social Change

The reproductive performance of a population is intricately related with social organisation; social norms, religious beliefs, economic goals, technological levels and much more. A number of social and cultural factors promote fertility. A number of social and cultural factors serve to lower it.

The level of fertility in a population, therefore, is the net result of mutually offsetting tendencies. Thus the net effect of the social changes on fertility that take place as a result of changing economic cirumstances, new communication systems, colonialism, independence, schooling and the like might be neutral or positive.

In the transition to industrialization and urbanization (a period of many social changes) it is conceivable that the fertility level could fall but, in fact, it almost always rises. It did so in England at the outset of the industrial revolution and led to a "Disintegration" of village society. The proximate causes

were a higher incidence of illegitimacy, a lowering of age at marriage, a higher overall marriage rate and less frequent or less effective control of conception within marriage. Japan's experience was similar.

The same may also be the case in India. Data show that women in joint families have a lower fertility level than those in simple families and that the social changes due to urbanization are causing a decline in the number of joint families and seem to have led to an increase in marital fertility.

It is generally a matter of shame for women to give birth to children after they become mothers-in-law, particularly in joint families. Mothers-in-law are subjects of popular jokes if they become pregnant during the pregnancy of their daughters or daughters-in-law. Hence women in joint families tend to limit the frequency of coitus after their sons are married.

Research done at Karachi also demonstrates the same tendency, namely, that fertility is higher in women in nuclear families than in extended families. (Hashmi 1965.[2])

In making a small family size feasible, therefore, incentives are offered to the family and made realistic to adopt, such as :

A. Making schooling free and compulsory and thereby removing children from the ' labour market '.

B. Provision of modern methods of cultivation and mechanization to the farmer, thus reducing the number of hitherto needed hands on the family farm.

C. The provision of old age pensions thus making it unnecessary for a couple to have one or two sons to look after them in their old age and be their security.

D. Raising the status of women by education and allowing them to enter the labour market, some to pursue careers and thus removing the concept of universality of marriage.

E. Improving socio-economic conditions or affecting modernization so that the maintainance of an improved status can only be affected by a small family size.

F. Premarital preparation for young adults so that they are fully aware and prepared for the responsibilities of marriage both as regards to themselves and their future children, and that of the society and country at large.

Inspite of the massive effort involved in the Indian family planning programme, it is doubtful whether its impact or desired effect has been proportionate to the financial expenditure involved.

In other words, to what extent or what contribution has family planning by contraception, sterilization or abortion made to the hitherto modest reduction of India's birth rate ?

And what role has improved or wider education and socio-economic development played in reducing the birth rate as compared with that played by family planning ?

To what extent can the family planning programme be justified ? To what measure has it contributed to the positive family life and welfare ? As Berelon says " What we seek is human welfare, personal freedom, the quality of life and demographic trends and changes take on meaning only insofar as they contribute to such ends. And evaluation should keep that closely in mind - what we really are after. Some costs, in short, are too high, for population control is not the final value."[3]

Family Planning has been explained in different ways : for example, "Family Planning is any attempt by people to make their reproductive behaviour consistent with their circumstances and with their goals and values. "

If one maintains that the family planning programme has not achieved its target (and hitherto it has not, in India), what are the reasons ? Do Indian families in villages seem still to prefer a 'large size' (over 3) and if so are we aware of the reasons ?

" Obviously, child-bearing is started by a coital act between the couple.

If we dig down deeper into many suggested causes of fertility behaviour, one of the primal factors would be coital dynamics, that is, how pro-natalistic versus anti-natalistic coital acts are determined between the couple.

Sandbery and Jacobs in a study, tentatively formulated 14 reasons, why a couple fails in contraception inspite of the conscious wish for contraception. These are denial, love, guilt, shame, coital gamesmanship, sexual identity conflicts, hostility, masochism, nihilism, fear and anxiety, abortion, availability, oportunism and iatrogenesis.

This shows that reasons why people have intercourse are more than for sensual pleasure or to satisfy a reproductive urge and possibly involve a rather complicated set of psycho-dynamics.

Ethics, Religion and Family Planning

"Anything as fundamental, mysterious and awesome as the birth of new life is inescapably related to man's religious instinct. The miracle of birth links the living with the dynamic, the creative element in the universe."

RICHARD FEGLEY

Excessive population growth poses ethical questions because it threatens existing or desired human values and goods, and because all or some of the possible solutions to the problems have the potential for posing difficult ethical dilemmas. Choices are required among a variety of values. Excessive population growth poses threats when physical security and health are endangered, political conflicts are endangered, economic development hindered' the environment polluted, non renewable resources rapidly dissipated and psychologically harmful crowding and forced migration intensified; to mention only a few of the possibilites. Anyone of these factors, or a combination of them, has the potential to undermine human life. The decision to act or not to act in the face of the threats is an ethical decision. It is a way of affirming where the human good lies and the kinds of obligations individuals and societies have towards themselves and

others. A choice in favour of action will, however, mean the weighing of different options, and most of the available options pose ethical dilemmas.[5]

It is widely found that religious differences result in differential fertility, but not so great as to move out of the 2 to 4 desired family size. But familistic orientation includes strong disapproval of the childless and one child family, though families of 5 or more children are not desired.[6]

In the U. S. A, differentials in family size were noted between Catholics and others but this gap is narrowing in more recent surveys. In Britain, a study in 1959 showed that 39. 3% of those who claimed to be Roman Catholics also admitted to using contraceptive techniques other than those approved by the Church. (Rowntree and Pierce 1961). The Hutterites a small Anabaptist Mennonite community in the U. S. A. and Canada have strong religious values which emphasize and support high fertility. Furthermore, because of the communal way of living, additional children do not represent an additional burden.[7]

In a study done in India, people's attitudes and beliefs on certain diseases and family planning were obtained. It was interesting to note

a) 66% of Hindus, 57% Muslims and 58% Christians were favourably inclined towards family planning.

b) maximum proportion of favourable were found in the age group 25 to 35 in all religious groups.

c) the proportion of persons of the "Do not know' group was found to decrease with increasing educational qualifications.[8]

Freedom of choice remains a fundamental right for the individual. The choice he makes should be guided by the importance of the "duality of life" he chooses for himself and his wife and children. Who can dispute the belief of those who put a higher priority of spiritual values than material. One would like to have both, and they do not necessarily preclude each other. What choice can men in the Third World make? and is he

making the right choice? These are questions that remain unanswered?

Also has the "value of children" been given due attention? Can family planning conserve this value (not financial) that children have for their parents? The concept that a child can be detrimental to the family welfare is foreign to many cultures and abhorent to others as is the notion that it is possible or even desirable to attempt a modification of anything so private and personal as the sex life of a couple.

Can a family planning programme give equal importance to quality of family life as to its quantity? Have people been educated into their responsibilities as marital partners? Has family planning (especially the oral contraceptive) any positive connection which the increased incidence of promiscuity, venereal disease and illegitimacy?

Contraception does not protect against illness or death, but against a quite normal physiological process.

Moreover, has the infrastructure of the whole family planning programme ever existed? Is it in response to the felt needs of the people?

These are important considerations that must be given due weight. "If there is one thing which experience with family planning has shown, it is that people are not motivated to limit their families by populations statistics, or even by the ease and availability of contraceptives, but by a whole set of social factors impinging on their personal lives and changing over their life cycles. In the vast majority of the societies of the world these factors serve to promote human fertility."[10]

The health impact of family planning occurs primarily through the following effects on human reproduction :

1. The avoidance of unwanted pregnancies and births, and the occurence of wanted births that might otherwise not have taken place;
2. A change in the total number of children born to a mother:
3. Variations in the intervals between pregnancies;

4. Changes in the times at which births occur, particularly the first and the last, in relation to the age of the parents, especially the mother.

The Family Planning Programme in India

India's national family planning is the largest in the world. India has signed the UN declaration on population. A voluntary Family Planning Association also supports the programme.

Legislation

There is no anti-contraceptive legislation. The minimum age of marriage was fixed at 18 years for males and 15 years for females by law in 1929. Since then, the age of marriage has in practice been rising and today stands at over 16 years in the case of girls. Raising the marriage age to 18 for girls and 21 for men is now under consideration.

Some states have also passed legislation affecting family size, for example Madhya Pradesh and Maharashtra have limited free government medical facilities to those with three children or less.

A new abortion law came into effect in April 1972. Under the new law, medical termination of pregnancy is allowed on health, eugenic, socio-economic and humanitarian grounds. The new law has also made abortion legal in those cases where pregnancy results from failure of contraceptive method. It amounts to abortion on demand.

Plan	*Budget Allocation*	*Actual Expenses*	*Clinics*	*Method Stressed*
1st 5 - Yr Plan (1951-56)	3 million	1.5 million	147	Rhythm
2nd 5-Yr Plan (1956-61)	49.5 "	22.0 "	4165	Foam Tabs & Vasectomy
3rd 5-Yr Plan (1961-66)	270.0 "	250.0 "	20000 +	I.U.D:
4th 5-Yr Plan (1969-74)	3000.0"	—	—	—

Expenditure in 1970-71 was 470 million. Rs.

Target

The Fourth Five Year Plan stipulated a target birth rate of 32 per 1000 by 1974 and 25 per 1000 by 1978-79, with a growth rate of 1.5% by the end of the seventies decade.

Organization

The organization and administration of Health and Family Planning under the Indian Federal Constitution are state subjects. While 18 State Governments and 11 Union Territories are responsible for the administration and implementation of the programme, virtually the entire cost is borne by the Central Government. A Central Family Planning Council, renamed National Institute of Family Planning in 1971, headed by the Union Minister for Health & Family Planning and including State Health Ministers, representatives of leading voluntary organizations and others involved in the Family Planning Programme, provides the means of effective Centre-State communication and coordination. At the state level, the responsibility for administrative supervision and implementation of the programme lies with the State Family Planning Bureau. There is a close coordination at all levels between federal, state and voluntary family planning programmes.

By mid-1971, the organizational set up included :

1.	State Family Planning Bureaux	18
2.	District Family Planning Bureaux	325
3.	Urban Family Planning Centres	1812
4.	Rural Family Welfare Centres	5100
5.	Rural Subcentres	29996
6.	Other medical institutions doing rural f.p. work	7589
7.	Other institutions doing f.p. work	2288
8.	Mobile units for a) Sterilization	431
	b) IUD	432
9.	All major hospitals also provide family planning services.	

Services – The Cafeteria Approach

The main feature of the programme is the cafeteria approach whereby married couples are free to choose from among a range of scientifically approved and tested contraceptive methods and devices consisting of male and female sterilization, IUDs, condoms, foam tablets, jellies and diaphragms. A start has been made to introduce oral pills into the programme. 317 experiment projects have been set up. It is estimated that 100.000 women in urban areas use oral contraceptives prescribed by private practitoners.

As a result of the programme efforts so far, about 8.9 million sterilizations have been performed, 3.9 million IUDs inserted and conventional contraceptive-couple years of protection are now at an annual level of 2.1 million. This covers approximately 8% of the country's 100 million couples in the reproductive age. In 1970-71 an estimated 2.2 million births were prevented. It is estimated that since its inception, the programme has prevented 7.4 million births up to 1970–71. The total number of annual acceptors has been rising steadily.

India	*Sterilizations (thousands)*	*IUDs (thousands)*	*Conventional contraceptive users (thousands)*
1965-66	671	813	582
1966-67	887	910	465
1967-68	1840	669	475
1968-69	1664	480	916
1969-70	1422	459	1515
1970-71	1312	466	2139
1971-72 9th Apr/Jul)	272	113	2075

It is difficult to measure the success of a programme as vast as that of India. However, it is indicated that as a result of the family planning programme, the birth rate has reduced from 41.7 per 1000 in 1961 to 37.4 per 1000 in 1970. Decline in birth rates have also been reported in particular areas :

Gandhigram, Madras	1962–40/1000	1965–36.3/1000
Calcutta	1963–26/1000	1964–22/1000

Payments are made for IUD insertion and sterilization to the patient, 'motivator' and medical personnel. These vary in amount from Rs 10 to Rs 250/- depending on the source. State Governments allow about Rs30/- broken up between those involved. The Government has set up a network for the commercial distribution of the condom.[12]

The '*extension service*' has replaced the centre or 'clinic' approach. In actual practice, the extension service is functioning poorly. Two reasons are given for this : overestimation of the effectiveness of the extension service workers and underestimation of the resistance of the client-couples.

The Indian Family Planning Programme has made little visible impact, yet it cannot be considered as a failure. The major obstacles that hinder success were found to be :

a) A value system that limits motivation
b) Social and demographic features
c) Lack of commitment of family planning workers
d) Lack of contraceptive technology to suit Indian conditions.

What is needed is a contraceptive that is safer, simpler, more acceptable cheaper and reversible.

India's official family planning programme for 1973-74 has been severely cut. The 1972-73 figure of $101 million is reduced to about $68 million. Among the chief targets in the Governments's economy drive are the mass experimental sterilization camps with special incentives, of which 150 were set up in 1971-72.

"It might be all right for Delhi" says the wrinkled farmer from Haryana jerking a contemptuous thumb at a towering hoarding proclaiming the Ministry of Health and Family Planning's conviction that a small family is a happy one. 'But here we know that large families are the happiest.'

Since the average Indian couple must have at least 6.2 children before it can reasonably expect one son to grow to maturity, the preference for sons means in effect considerably larger families.

Rural India is not, therefore, shedding any tears over a drastically reduced family planning programme. But this indifference is not shared in the nearby integrated health centre. Though something of a showpiece, the clinic now faces a bleak future.

The threat is as much to the movement to stabilize numbers (India's population has grown over to 572 million since the 1971 census reading of 547.4 million) as to the personal security of more than 85000 doctors. extension educators, auxiliary nurse-midwives and other para-medical personnel working in about 40,000 health and family planning centres.

The proposal to entrust some family planning responsibility to panchayats - rural self-government councils—was mooted for instance, by a United Nations advisory mission as long ago as 1965. So too was the scheme to concentrate on major social units such as industrial firms, plantations, government offices, the armed forces and other organized communities. A second UN mission cautioned against premature expectations in 1969. It also argued forcefully for inclusion of family life instruction and some knowledge of population dynamics in school curricula. These rediscovered ideas are now being flaunted as the basis for a far more thrusting campaign of the future, though no reference is ever made to the UN reports.

An effective strategy may yet emerge from this reappraisal of past-performance even if the exercise has been forced on the department by outside factors. But it remains unclear if this rethinking is part of a premeditated plan or merely a response to budget stringency. If the former, it is only a desperate groping for a long range alibi in the form of societal change which must inevitably be a grindingly slow process? or has the overextension of slender resources in the 1971-72 experiment with 150 mass sterilization camps with special incentives (3.3 million acceptors) left be department exhausted, if not bankrupt? Offlcial replies to these questions are not entirely reassuring.

The feeling is certainly growing that controlled fertility is only one of the demographic variables ; that social and economic conditions will, in the long term, play as decisive a role in bringing down the rate of population growth which now stands at 37 per thousand against the 1973-74 target of 32. This conclusion is encouraged by the experience in Kerala and Tamil Nadu where the birth rate has reportedly declined to below 32 ; a development that is attributed to responsible state administrations and a high degree of literacy, especially among women.

But the shifting of emphasis raises two points that have yet to be satisfactorily resolved. First, have the direct methods of fertility control become less important with the greater emphasis attached to long term socio-economic variables ? And secondly, can posters and propaganda induce changes in the sexual life of a society which has so far paid little heed to official disapproval of such pernicious traditions as child marriage and the dowry system for brides ?

Impressive statistics are trotted out to substantiate this claim. Since 1965, the department has distributed over 322 million condoms, sterilized 14 million people and inserted 4.75 million IUDs. With 1966-67 as the base year, there had been a 245 per cent increase in the number of sterilizations and a 501 per cent rise in the number of condom users by 1971-72.

At the same time, the lack of awareness of the family planning message is indirectly corroborated by the Operations Reasearch Group finding that only 14.5 per cent of an all-India sample could identify the family planning symbol of a red triangle.

A political bias against particular sponsors or individual methods would not have resulted in general apathy if Indian politicians were not at the same time fatalistically convinced of the country's ability to absorb nature's millions. It is pointed out, in justification, that the national income was much higher during the 24.5 per cent population growth decade (1961-71) than in pre-1947 British Indian when population did not increase by more than 1 per cent.

The conflict is between the logical calculation and emotional conditioning though the latter can be appealingly rationalized. The belief that motivation in family planning creates an aspiration-oriented society, sharpens social disparities and encourages personal licentiousness, is articulated by the *Gandhian Institute of Studies in Varanasi*, but probably enjoys much wider currency. The 'baby or car' choice must also seem immoral to many Indians, who instinctively shrink away from any interference with natural processes.

Probably, because of defective methodology in opinion polls, there is no reliable guide to public attitude on these points. Surveys conducted by the Indian Institute of Management (Calcutta) and by the All India Institute of Hygiene & Public Health, claim an extremely low degree of opposition to birth control on account of religious dogma or ideological conviction.

Because the Government is not yet convinced that the population explosion can wipe out all growth projections and neutralize the fruits of economic development, the effort to deal with it is still officially described as a 'programme.' This means that it can be wound up and most of its workers dismissed at a moment's notice: the superstructure is still temporary.

Because it is a programme with an uncertain existence, and not a permanent undertaking, it is the obvious victim of an economy drive.

Apologists for temporary programme argue that only the Damocles sword of retrenchment obliges motivators and other personnel to fulfil set targets within the specified six months. What the plea overlooks is the counterproductive emphasis on quantity rather than on quality.

This is particularly so where vasectomy is concerned. 'About 5¼ per cent of the vasectomy cases that were brought were unfit,' says a worker. Some were unmarried adolescents. Other ageing widowers. There have been complaints elsewhere of mentally retarded or physically handicapped men being dragged to the operating table.

Compulsion plays no part in the Indian system; Gandhian sociologists and radical economists are alike outraged at ruthless use of irresistible pressure. A field-worker said that faced with stiff competition from well endowed and all-powerful administrators, he and his colleagues often had to bribe volunteers for sterilization.

Given this dimension, it is only too tempting to plead that all the contraceptives in the world will not change societal patterns until it becomes rewarding to have smaller families and, in particular, fewer sons. But it is surely early in the day to attempt to write-off the campaign with the plea that 'every additional rupee spent on family planning will not yield a rupee's worth of results.'

A less defeatist course would be to use present restrictions to thoroughly re-examine the entire strategy. The results might be a sustained minimum needs programme to increase public awareness, bridge the gulf between awareness and acceptance. and to take the advantage of socio-economic changes as and when they occur.

The ideas now being mooted are not intrinsically bad. Since 42 per cent of the population is below 16 years of age, school instruction will have a positive long term impact. The motivational trigger of better education, health, housing, nutrition, employment and welfare services will only operate through the inter-action of several departments.

There is also a valid case for involving private and professional organizations such as the Indian Medical Association which has about 136000 members; the Government simply has not the machinery to mount a meaningful campaign in 600.000 villages. But such long term aspects are not likely to achieve much without a continuing campaign to reduce the birth rate.

The programme suffers in the meanwhile from a number of minor irritants which should be ironed out. Rustic matrons with several children around their skirts are not always most receptive to unmarried young auxiliary nurse-midwives. The urban based educator fates difficulties of communication in

the interior. Some reports suggest that medical and para-medical personnel do not always work in harmony. Family planning budgets are deceptive since funds also subsidise the health services.

The best that can be hoped for a more modest programme is that these internal contradictions will be eliminated so that a streamlined organisation can be prepared in readiness for a political commitment to what is generally regarded as the single most important item on the government's long term agenda.[13]

CONTRACEPTIVE TECHNOLOGY

The various methods that prevent conception (contraception) are classified in various ways. They may be classified by their composition of mode of action or by their resulting effects.

The simplest way is to classify them by the effect they have on fertility and describe the ways they act to produce this effect.

Methods of Contraception :

Temporary methods are those which while in use affect fertility, but once withdrawn have no effect, that is, they are reversible.

They are described by their mode of action :

1. Behavioural action
2. Mechanical action
3. Chemical action
4. Physiological action
5. The Intra-uterine Contraceptive Device.

Behavioural Action by Abstinence :

Abstinence from intercourse by self control which is continuous of permanent avoidance of intercource is particularly difficult and especially so for younger couples. It is rarely advocated (for obvious reasons) as a permanent practice.

Natural Family Planning :

The discovery by Ogino and Knaus that ovulation occurs approximately 14 days before the onset of the next menstrual period was an important advance in our knowledge of the factors determining conception. Evidence as to how long after ovulation the human ovum can be fertilized is mostly circumstantial, but a number of studies agree on a maximum duration of 48 hours.

The life of the sperm within the female reproductive tract is more variable; available evidence points to a duration of about 3 days but the possibility of longer survival in certain circumstances must be reckoned with.

On the basis of similar evidence one may postulate that the risk of conception resulting from the act of coitus should increase fairly sharply from virtually zero in the early part of the menstrual cycle to its maximum level during the three days before ovulation. After ovulation it should fall abruptly to zero level,

Coitus Reservatus is a method in which abstinence is not practised but ejaculation is avoided in normal intercourse. It enjoins great emotional and physical control by the man and is therefore not used as often as it might have been.

Periodic Abstinence practiced by the *Calender Method* (usually referred to as the Rhythm Method) is based on the assumption that ovulation takes place about the 14th day before the first day of the next menstrual cycle expected. Couples using this method abstained for 3 to 4 days on either side of this '14th' day.

In couples where the woman was menstruating regularly this method could work fairly well and is used with considerable success. As it involves no device or medical attention it is advantageous for the average woman who abhors these for aesthetic reasons. Moreover, women do not usually find this periodic abstinence difficult to practise. especially when they have strong reasons for avoiding pregnancy. The motivation this provides will carry them through considerable difficulties.

However in women whose periods are irregular or whose husbands are away at frequent or prolonged periods, this method has serious problems.

One fact remains that 'the Rhythm' requires the same sacrifice for personal pleasure from each member of the partnership. In too many of the modalities of artificial contraception, the woman is insulated if not actually endangered. Rhythm affirms the adult code — responsible action — for the sake of a principle.[2]

Temperature Method

However in recent years the scientific fact that ovulation must necessarily take place before conception and that certain changes take place as a result of ovulation has prompted the use of the Natural Method of Family Planning either by use of the Temperature, or Ovulatory signs and symptoms, or both.

The secretion of the female hormone 'progesterone' which is abundantly secreted by the Corpus Luteum has a thermic effect on the basal body temperature (that is the body at rest) and the temperature rises from 0.20 to 0.50. The high temperature graph forms a plateau known as the 'Thermic Plateau.' When the Corpus Luteum shrivels and dies, the secretion of progesterone decreases and the temperature falls.

The Temperature is an exact and scientific indicator of occurrence of ovulation but its disadvantages are :

1. That it may be affected by other fertile conditions (fever).
2. The taking of temperature, its reading and recording and interpretation may be sometimes difficult, though once understood is comparatively easily done

The view that illiterate women would be unable to maintain proper records has been amply disproved in India (Calcutta), Mauritius and Tonga.

Symptothermic Method

In addition to temperature there are certain signs and symptoms that precede ovulation and are due to increased amount of oestrogen. They are :

1. Excessive egg-white type of mucus discharge from the cervix known as *Mucorrhoea*. This is an extremely good indicator of impending ovulation.
2. A feeling of fullness in the breasts or slight tingling pain or discomfort as ovulation approaches.
3. Pain in the abdomen radiating down to the groin, on one or other side of the abdomen.
4. Slight pinkish or even frank blood-stained discharge (due to bursting of the follicle from the ovary.)
5. Emotional changes ranging from increased irritability or moodiness to euphoria.

In the Symptothermic Method of Natural Family Planning, the effectiveness of the method is greatly enhanced by the double check whereby the scientific sign of temperature rise after ovulation is used together with the symptoms that precede and accompany ovulation.

Mucus Method

The mucus sign described above can be used by itself as Billings has convincingly shown in his work. It is based on self-knowledge and is being used in several countries including India. It can be effectively taught by trained lay

educators, thereby removing it from the medical or clinical sector. As elucidated by Billings, a fertile menstrual cycle can be described as :-

1. The menstrual period,
2. The 'dry days' which occur after the cessation of the period, provided the cycle is not unusually short with an early ovulation. The dry days are recognized by a positive sensation of dryness of the vulva. Needless to say, the interior of the vagina is always moist and self examination of the vagina is not required nor advised.
3. The mucus days. Commencement of the mucus is recognized by the disappearance of the sensation of dryness. Within a day or so, the mucus is sufficient in amount to be seen, and at this stage will be observed to be cloudy, white or yellow, and to have a sticky consistency.
4. As the time of ovulation approaches, the mucus becomes more transparent, and elastic so that it will stretch without breaking (the spinnbarkheit). As the symptom reaches its peak, the mucus will produce a definite lubricative sensation which the woman will notice in the course of her normal activities; at this stage the mucus is slippery and facilitates intercourse. Sometimes this 'raw egg-white' persists for two or three days and the last of these days is recorded as the peak. On subsequent days the mucus reverts to its cloudy and sticky characteristics. The peak symptom has been shown to occur approximately 0.9 days before ovulation and marks the day of maximum fertility in the cycle, (a practical point which can be useful for those couples who have had difficulty in achieving pregnancy).
5. The interval of about two weeks which elapses between the peak symptom and the subsequent menstrual period. In some cases the mucus persists or recurs

during these days, but has the 'non-fertile' attributes of cloudiness and stickiness; it is not long before a woman will know that this mucus is nothing like the mucus indicating possible fertility. [3]

The International Natural Family Planning or Family Philosophy

The Guys (Doctors Francois and Michelle) of Grenoble, France, have prepared a first attempt spelling out of 12 general principles which might serve as a dialogue among various groups or at least a basis from which a consensus might develop.

1. Population growth is not the only problem of the contemporary world.
2. Birth regulation is primarily a concern of the couples before it is that of the Government.
3. Birth regulation is one of the questions which couples have to face.
4. Family Planning can be achieved by 2 general approaches :
   — Trusting primarily on technology
   — Trusting primarily on the stewardship of persons. Natural Family Planning prefers the latter which fosters the three basic values of the couple and family.
5. The first value is the respect for Human Life.
6. The second value for the woman as a person
7. The third value for the man as a person.
8. The self knowledge and awareness through a couple-to-couple-fostered grass-roots education.
9. Mastery of conjugal life through dialogue
10. Through personal choice for man and woman, a realisation of true autonomy.
11. This progressive growth and development requires time and stability for the couple.

12. Every person can discover these values of life and personhood, and faith in God gives the believer supplementary enlightenment in his conjugal life and fortifies him in his choice.[4]

The history of Rhythm practice in India is unfortunate. Though this method would suit the Indian culture and temperament in the view of many, it had such an introduction to India that it has got an undeservedly bad name.

The Government of India asked the WHO for technical aid to promote its Family Planning Programme in 1950. As certain Catholic members of the United Nations objected to the world body offering scientific contraceptive advice even to non-Catholic countries and as India's then Health Minister was "Gandhian" on the birth control question, (Mahatma Gandhi opposed contraception and favoured moral restraint for India), WHO's response was to send the late Dr. Abraham Stone, America's Planned Parenthood expert, to India, to set up a series of pilot projects to try out the Rhythm or safe-period method of Family Planning.

The WHO assignment specifically stated that family planning was to be confined to the Rhythm Method 'on assumption that if this method were to prove successful on a large population basis, it would represent a simple method for dealing with family planning in India'. The Health Minister felt that this method would not go against the traditions, culture and mores of the Indian people, and in addition it would have the advantage of not requiring any expenditure for supplies.

As a result, five centres were set up in New-Delhi, Mysore and West Bengal, States where the Rhythm method was taught to selected couples. But teaching the safe period to illiterate wives in backward rural conditions raised its own problems. Reliance on the Rhythm method implies accurate records and careful calculation of the menstrual cycle and of fertile and infertile days. Some simple techniques therefore had to be developed. Dr. Stone and

some Indian physicians hit upon the idea of the mestrual cycle beads. There were orange beads for the days of menstruation, gr een beads for the safe non-conception days and red beads for the fertile or baby days. The beads were strung for the individual woman on the basis of her menstrual cycle and she was instructed to move one bead daily from one side of the string to the other, beginning with the first day of menstruation. During the time that the green beads appeared she was in the safe period and when the red beads came around, sexual relations were to be avoided.

When the necklaces of coloured beads were distributed to the women willing to practice family planning no one anticipated how many snags there were going to be in translating this apparently simple device into effective action. An improvement was effected in retaining the colour but changing the shape of the beads into round and square ones: round red beads were unsafe, square green beads were safe. A necklace with a safety catch was devised which permitted the movement of the beads in only one direction.

Some women simply forgot to push the beads. Some decided not to wear the necklaces because they did not want the whole village to know that they were practising family planning. And some mistook the beads for charmed amulets distributed through the courtesy of the Government of India. They thought it was enough simply to push the beads to space or limit their families. Needless to say, the Rhythm method failed to bring down the birth rate. [5]

Coitus Interruptus

One of the oldest and most widely practised methods even today and in countries where contraceptives are freely available (eg France) is coitus interruptus. The male organ or penis is withdrawn from the vagina before ejaculation. The disadvantages of this method are that it is often ineffective because of sperm release in the precoital secretion, or late withdrawal. It is also associated with a feeling of "incompleteness" and anxiety, as the act is suddenly terminated.

However, it requires no device or medical consultation and is still very commonly used.

Mechanical Methods

Mechanical methods like the condom or Nirodh worn by the male, act as barriers and prevent the sperms from travelling upto the tube. The diaphragm, cervical cap, vault cap and vimule are worn by the women and are fitted on by her just before intercourse. (Initially these must be fitted by a doctor). They must remain in place for at least six hours after intercourse and need regular cleaning and change.

If used in conjunction with spermicidal lubricants, their effectiveness is increased. Women often dislike these methods because they are coitus-dependant and unaesthetic. Besides, they often fail to prevent conception.

Chemical Methods

These are Foam Tablets, Jellies, Pastes and Creams. They form a physical barrier and also affect the sperm chemically. They are used by the women alone or in conjunction with mechanical methods.

They are coitus-dependant, sometimes expensive and often ineffective. They are not used to any great extent in developing countries.

I. U. C. D.

The intra uterine contraceptive devices have been used for over a hundred years. They are made of plastic, polythene or copper wire. I.U.C.D.'s impregnated with progesterone are now being examined and investigators claim that these lower the pregnancy rate, the removal rate and the expulsion rate.

They are cheap and effective but require introduction by a doctor and continual follow-up for side effects or complications that occur.

Their mode of action is not properly understood but they act most probably by increasing the contractility of the tubes and hastening the passage of the ovum which is extruded into the vagina. It also affects the endometrium (lining of the uterus) and makes it unsuitable for nidation, should the ovum be fertilized.

Contraceptive Pill

The contraceptive pill imitates the physiological tion of the female hormones. The Pill contains in general two hormones, oestrogen and progesterone. The action of oestrogen is to develop the uterine lining or endometrium so that menstruation continues. It also inhibits the secretion of Gonadotrophin from the pituitary gland which in turn suppresses ovulation.

The pill is absolutely effective in preventing pregnancy if taken regularly. It is given daily for 21 days from the 5th to the 25th day of the cycle. Large depot doses of Progesterone by injection and other uses of the hormone for contraception, are being experimented on or used. A male contraceptive pill is also being tested in India. It is based on Androgens and prevents sperm maturation.

Work is being done on anti-androgen substances which reduce sperm counts. The use of gonadotrophin-inhibiting substances in males is also being explored. Also, the " unisex pill " which is on clinical trial is being used by each spouse for a year alternately when norgoestrienone is administered. to inhibit ovulation and spermatogenesis alternately.

A lot of experimentation varying from the use of of prostaglandins to pheromones (substances produced by one animal and affecting the behaviour of physiology of another animal of action, ingestion or absorption) is being carried out.

Much more work has to be done on the immunological approach and the development of a 'kitchen method' to detect ovulation.

Research to develop a synthetic peptide to control ovulation is being carried out in America and research on Ovulation Detection is going on in India, Australia and Italy.

Mougdal (India) is trying to produce antibodies to the Pituitary Gonadotrophic hormones in an attempt to control ovulation in the female and sperm production in the male.

The areas of concern with the existing oral compounds are not that they are ineffective, not that they are aesthetically objectionable, not that their use is not related to the time of the intercourse, but to the known and unknown side effects. Many other body systems are affected. Potentially more serious are some of the metabolic changes—the relationship of intake of oral contraceptives to subsequent infertility due to persistent anovulation, the low frequency but high amplitude difficulties of venous thrombosis and the still unanswered question of the possible influence on mammary carcinoma and coronary artery disease.[7]

Permanent Methods

Permanent methods are Surgical sterilization of the male, known as *Vasectomy* and surgical sterilization of the female, known as *Tubectomy*. They are largely irreversible.

Female sterilization is effected most commonly by surgical methods. More recently the use of laparoscopic sterilization with tubal clips or cautery is being used. Female sterilization is an expensive procedure requiring skilled surgery and medical facilities.

Permanent methods are effective but expensive and adequate psychological preparation of the person undergoing sterilization is necessary.

In rural areas of developing countries considerable arrangements regarding proper surgical procedures and after care must be made.

THE UNBORN CHILD

"Abortion is at once a moral, medical, legal, sociological, philosophical, demographic and psychological problem, not readily amenable to one-dimensional thinking"

D. CALLAHAN

Abortion

It is interesting to note that the present controversy on abortion has been raging since ancient times. Even today, when several countries both in the First and Second World and those in the Third World have "legalized" abortion, this controversy is most active, About it Callahan says, "I am naive enough to suggest there are grounds for hope. The basis of this hope is three-fold. First there are no important groups which would deny that life should be protected and enhanced ; second, there are no groups which deny that human rights come into direct play in abortion decisions : third, there are no groups which deny that people should be morally responsible for the choices they make on abortion."[1]

Abortion is widely considered both a social and a medical (or health service) problem. The socio-cultural aspects of this problem are so varied and so intimately associated with the historical, legal and religious patterns of individual countries that it is difficult to attempt any brief analysis of their complexity or to generalize about the way rapid population growth affects specific situations.

It appears that as traditional societies begin to make the transition from high to low fertility, the popularity of induced abortion as a method of fertility control rises markedly. It has become an epidemic; and assumed an endemic pattern in certain countries.

In some hospitals in developing countries from 1/4 to 1/3 of hospital maternity beds are used for post abortion cases. Yet, low-cost legal abortion service cannot be provided unless there is a realistic resource base of facilities and trained personnel. This, must be one element in the decision whether to provide legal abortion facilities as a major component of a fertility control programme designed to contribute to social and economic development. In-so-far as possible, the need for abortion should be minimized by providing women who wish to avoid pregnancy with easy access to family planning materials and information.

However, the complete elimination of abortion through the effective use of contraceptives is a distant and probably not attainable goal. In those societies in which the drive to limit family size is strong, the use of abortion tends to rise.

Statistics suggest that abortion is one of the world's most commonly chosen methods to limit fertility — despite the fact that in most societies it is ethically offensive, illegal, expensive and medically hazardous.

In five countries of Western Europe it is estimated that there are as many illegal abortions as live births.

In Latin America illegal abortion rates are among the highest in the world. In one country, they are said to

total three times the live birth rate ; in another, to be the cause of two out of every five deaths of pregnant women.

Further, there are indications that the illegal abortion rate in Latin America is increasing, and that multiple illegal abortions among mothers are becoming common.[2]

According to statistics there are about 6.5 million abortions in India of which 3.9 million are induced.

The Medical Termination of Pregnancy Bill enacted in 1972 hoped that abortions carried out openly in sanitary conditions by experienced doctors would not have the stigma or the dangers of clandestine operations. This law was not meant to provide a method of family planning.

At present, facilities available for abortion in the country are limited and large-scale abortions cannot be resorted to unless these facilities are developed.

The Japanese case makes it clear that frequent abortions leave women mentally and emotionally disturbed.

The Hindu law-givers have, throughout the ages, recognised situations in which a woman could resort to abortions without any stigma attached to her. With its emphasis on the equality of the sexes, progressive thinking also demands that a woman should have full freedom to decide whether she wants to have a child.

To avoid frequent abortions which might ruin the health of a woman, some people advocate compulsory sterilisation of either of the couple after the second such abortion.[3]

The introduction of permissive abortion laws in Japan did have the effect of establishing a widespread abortion habit. This is the basis of Koya's warning to other countries thinking of similar programmes and the basis, affirmed by Koya and Muramatsu, of the difficulty in gaining more ready acceptance of contraceptions when easy abortions are available.

Regarding recent attitudes toward abortion in Japan, it is clear there is a widespread acceptance of and resort to abortion in Japan, even though a steady decline is discernible. On the other hand, there is continuing concern about the high

abortion rates and a desire to see them reduced. In a statement to Parliament (1967) Prime Minister Sato called for a reduction in the abortion rate and an effort to provide social conditions conducive to the raising of families,

Muramatsu believes that young educated Japanese women are not enthusiastic about the present abortion laws, citing one very small survey of college women which showed that half felt the law should be changed to allow abortion only for medical indications[14]

One European country with a long history of free abortion - Czechoslovakia - has recently begun to tighten its liberal policy.

One reason is a rising incidence in premature births due to cervical scarring, which is the legacy of repeated abortions. Until recently, 6 per cent of premature deliveries were the result of cervical incompetence; that figure has risen to 9 per cent and continues to mount, according to Czech officials. To a large extent, the situation can be explained by the fact that only one Czech woman in 10 uses any kind of contraceptive measure; most count on their gynaecologist to do the job. Contraceptives are considered unaesthetic.

Another reason for the reversal in government policy is economic. Abortion has been virtually free in Czechoslovakia since 1957, and in the years immediately thereafter nobody foresaw any great problems, says Dr. Jan Zidovsky, director of the Institute for the Care of Mother and Child in Prague. "However, now we are at the point where there are 200,000 live deliveries annually in the country and 110,000 abortions.

Recently, the government has begun to apply pressure to control the number of abortions, concerned by the fact that the Czech population has remained stable at about 14 million for the past decade. They are discovering that there simply aren't enough people around to satisfy the requirements of their commercial and industrial projects.

Medical indications for abortion are decided strictly by a woman's physician. An abortion for non-medical reasons can be obtained only before the twelfth week of pregnancy

under the following circumstances; if the woman is over 40, if she already has three living children, if she has been raped, if the family cannot afford another child. if her husband has died, or if there is no room for a newcomer in the apartment.

The woman seeking an abortion for non-medical reasons must present her case to a district committee, consisting of one gynaecologist, one director of health services, (for the area in which she lives) and one member of the local town council; the latter usually has considerable sway over the housing situation. He or she may be able to dangle the prospect of a larger apartment before the pregnant applicant, and thus remove the reason of inadequate living space from her argument of abortion.

Under a new policy issued in July of this year, the committee members are instructed to grant abortions only in cases of what they consider true necessity. Uptil now, many women have sought an abortion because they were more interested in having a new car or a place in the country than a new baby, according to Dr. Vedra.

"Often it is a young woman who has managed to get pregnant but doesn't want to get married...Other times the woman will claim the child's father is not her husband. In any case, it is often impossible to verify these explanations."

Vedra and Zidovsky are doubly concerned about the upswing in premature deliveries because their institution is known for high-quality obstetric care. The perinatal mortality rate stands at only 18 per 1,000, one of the lowest in the world. And 70 per cent of perinatal mortality can be attributed to prematurity.

Repeated abortion can have two effects: the cervix can become damaged and weakened, leading to spontaneous abortion or premature delivery; or the cavity of the eudometrium can become damged, leading to the formation of scar tissue and to spontaneous abortion.

The situation in Prague would be even more severe except for the fact that the Institute for the Care of Mother and Child makes special preparations for a woman who has

previously undergone an abortion and is trying to get pregnant. If she has had three or more abortions, either spontaneous or induced, she is asked to come to the hospital for investigation before conceiving.

Drs. Vedra and Zidovsky hope that the new government policy will not result in a resurrection of the abortion black market. Currently women are being subjected to an intensive advertising campaign, urging them to adopt less dangerous forms of birth control, or, if they are pregnant to consider having the child.

The only technique Czech surgeons use is surgical evacuation, regardless of the length of pregnancy.

Doctors' ignorance about the dangers of abortion has not improved the situation, says Dr. Vedra. Many have been assuring their patients for years that abortion is a completely harmless procedure, unaware of the consequences that are evident only when a woman decides she wants to have a baby.

Czech families are now urged to have at least two children and three if possible in order to get the population on the rise.

If the couple has more than two children, they are granted various tax decreases and extra allowances. With four children, the rent is cut in half automatically. The advantages do not increase beyond four children.

Another consequence of the abortion situation which Drs. Vedra and Zidovsky have noticed is a growing number of children born prematurely who must attend special schools because they are not as intelligent as their full-term peers. "What we face is not just a health problem, but a moral, philosophical, and practical one for the state as a whole.[5]

The abortion debate continues. An important contribution to it now comes from Margaret and Arthur Wynn.

In her paper Margaret Wynn is firmly of the opinion that "it would be wise for young women and their parents and future husbands to assume that induced abortion is

neither safe nor simple, that it frequently has long-term consequences, may affect children and makes young single women less eligible for marriage." The evidence in support of this statement comes from an analysis of a series of publications with much reference to overseas experience, which is often longer and more complete than our own. Her emphasis is on the long-term effects of abortion, which Arthur Wynn designates *latent morbidity*. In Britain notifications of abortion include only the complications occurring in the first week-much too short a period on which to base estimates of morbidity, especially when in the private sector patients are frequently seen only for one day. Moreover, nobody knows the extent of the failure to notify. The Wynns argue that there is enough evidence now available on which to base estimates of morbidity. Most importantly they stress that the longer the follow-up the worse the results. With a really prolonged follow-up that is, several years-a 30% morbidity rate may not be an over-estimate.

A previous abortion increases the chances of a subsequent perinatal death by 50% according to the British Perinatal Mortality Survey, and the experience of some other countries suggests that even this figure is an underestimate. In addition there may be a 40% increase in premature births, and these are known often to be associated with impaired mental and physical development. Ectopic pregnancies are increased two or three-fold after a previous abortion, and there is a four-fold increase in pelvic inflammation and menstrual disorders, while 2-5% of those who have abortions may subsequently be sterile. Husbands who desire a family, Margaret Wynn suggests, might justifiably be alienated from wives who fail to bear children because of termination of a prenuptial pregnancy for which they are not responsible.

As regards the consequences of abortion older women with families are in quite a different category from young single women. Arthur Wynn emphasizes the problems for the latter group by citing the statistically significant increase in premature labours, and he carries the story further by showing that they have an increased likelihood of postpartum haemorrhage, midtrimester abortions, rhesus isoimmunization, antepartum

haemorrhage, stillbirth, and even congenital malformation. Much of the evidence for these sequels of abortion comes from German experience, though it can be matched from Czechoslovakia too. And these results take no account of any psychological consequences of abortion.

Margaret Wynn shows that up to 1970 the numbers of illegitimate births-with all their social consequences in terms of unhappiness—had scarcely diminished, while the numbers of terminations of pregnancy in single women had rapidly increased. She infers that "abortion is being used increasingly as a contraceptive method." More than half the women seeking abortion had used no other method of birth control.

Doctors may legitimately ask what sort of society has been underwritten by the Abortion Act? Is it one of sexual freedom or even licence with serious consequences for those involved? Does legislation make any difference to human behaviour in such a delicate area, or does it drag along in the wake of public opinion? Has the Abortion Act made a change in behaviour which would not otherwise have occurred? Do these changes in behaviour matter? The questions crop up endlessly and still the answers seem no clearer. This is because they involve value judgements with elements of emotion, passion, and reason. Simple consideration of the pros and cons will not solve the dilemma, but it has to be attempted.

One aim of the Abortion Act was to get rid of back-street abortions with all their bad consequences. The back-street element may have been greatly decreased, but many of the bad consequences remain. Legal abortion has probably diminished the number of maternal deaths, and it could be argued that it may have enlarged the limits of human freedom. These factors might show a great sum of serious morbidity-and the final bill will have to be paid by those who undergo abortions, their children (if they have any), their immediate circle, and society at large. Is the price too high? Will any law make it different? Presumably there will always be casualties of cultural attitudes in any society, and whether one attitude is better than another remains

matter of opinion. Nevertheless, the Wynns have produced a very serious indictment of legalized abortion, which must be heeded by doctors and law-makers. Some may argue that their case is overstated, but it is well and dispassionately argued, and the supporters of easy abortion must look to their defences. The importance of the subject in social, economic, and human terms demands a similar dispassionate reply. [6]

Professor Communons of Athens, Greece, where an abortion is easily obtained, has found that of all the patients who go to him complaining of infertility, 80% owe their infertility to a previous abortion. Often this is due to infection having set in, causing inflammation of the tubes which have become blocked as a result.

The Medical Termination of Pregnancy Act (1972 INDIA)

BILL A.

To provide for the termination of certain pregnancies by registered medical practitioner and for matters connected therewith or incidental thereto.

Be it enacted by Parliament in the Twenty-first Year of the Republic of India as follows :—

1. a. This Act may be called the Medical Termination of Pregnancy Act, 1972.

   b. It extends to the whole of India except the State of Jammu and Kashmir.

   c, It shall come into force on such date as the Central Government may by notification in the Official Gazette appoint.

2. In this Act, unless the context otherwise requires Definitions.

a. Guardian, means a person having the care of the person of minor or a lunatic.

b. Lunatic has the meaning assigned to it in section 3 of the Indian Lunacy Act, 1912.

c. Minor, means a person who, under the Provisions of the Indian Majority Act, 1875, is to be deemed not to have attained his majority ;

d. Registered medical practitioner, means a medical practitioner who possesses any recognised medical qualification as defined in clause (h) of section 2 of the Indian Medical Council Act, 1956. Whose name has been entered in a state Medical Register and who has such experience or training in Gynaecology and Obstetrics as may be prescribed by rules made under this Act.

3. a. Notwithstanding anything contained in the Indian Penal Code a registered, medical Practitioner shall not be guilty of any offence under that code or under any other law for the time being in force, if any Pregnancy is terminated by him in accordance with the provisions of this Act.

b. Subject to the provisions of sub-section 4, a pregnancy may be terminated by a registered medical practitioner. Where the length of the Pregnancy does not exceed twelve weeks, if such a medical Practitioner is or
When Pregnancies may be terminated by registered medical practitioners.

1. Where the length of the pregnancy exceeds twelve weeks but does not exceed twenty weeks if not less then two registered medical practitioners are of opinion formed in good faith, that———

a. The continuance of the pregnancy would involve a risk to the life of the pregnant woman or of grave injury to her physical or mental health ; or

b. there is a substantial risk that if the child were born, it would suffer from such physical or mental abnormalities as to be seriously handicapped.

Explanation II. Where any pregnancy occurs as a result of failure of any device or method used by any married women or her husband for the purpose of limiting the number of children, the anguish caused by such unwanted pregnancies may be presumed to constitute a grave injury to the mental health of the Pregnant woman.

2. In determining whether continuance of a pregnancy would involve such risk of injury to the health as is mentioned in sub-section, 2. account may be taken of the pregnant woman's actual or reasonable foreseeable environment.

3. a. No pregnancy of a woman who has not attained the age of eighteen years or who having attained the age of eighteen years is a lunatic, shall be terminated except with the consent in writing of her Guardian.

b. Save as otherwise provided in clause a, no pregnancy shall be terminated except with the consent of the pregnant woman.

4. No termination of pregnancy shall be made in accordance with this Act at any place other than——

a. A hospital established or maintained by Government*, or

b. A place for the time being approved for the purpose of this Act by Government.

5. The provisions of section 4, and so much of the provisions of clause d. of section 2, as relate to the possession. by a registered medical practitioner, of experience or training in Gynaecology and Obstetrics shall not apply.

6. 1. The Central Government may, by notification in the Official Gazette, make rules to carry out the provisions of this Act.

2. In particular and without prejudice to the generality of the foregoing power, such rules may provide for all or any of the following matters namely ....

COMMUNITY HEALTH CELL
326, V Main, I Block
Koramangala
Bangalore-560034
India

a. The experience or training or both which a registered medical practitioner shall have if he intends to terminate any pregnancy under this Act : and

b. Such other matters as are required to be, or may be, provided by rules made under this Act.

3. Every rule made by Central Government under this Act shall be laid as soon as may be after it is made, before each house of Parliament while it is in session for a total period of thirty days which may be comprised in one session or in two successive sessions, and if before the expiry of the session in which it is so laid or the session immediately following both houses agree in making any modification in the rule or both houses agree that the rule should not be made, the rule shall therefore have effect in such modified form or be of no effect, as the case may be; so, however, that any such modification or annulment shall be without prejudice to the validity of anything previously done under that rule.

7. 1. The State Government may, by regulations..... ...

a. Require any such opinion as is referred to in sub-section 2. of section 3. to be certified by a registered medical Practitioner or Practitioners concerned, in such form and at such time as may be specified in regulations and the preservation or disposal of such certificates.

b. Required any registered Practitioner, who terminates a Pregnancy to give notice of such other information relating to the termination as may be specified in such regulations.

2. The notice given and the information furnished in pursuance of regulations made by virtue of clauses b, of sub-sections 1, shall be given or furnished as the case may be, to the Chief Medical Officer of the State.

3. Any person who wilfully contravenes or willfully fails to comply with the requirements to any regulations made

under sub-section 1, shall be liable to be punished with fine which may extend to one thousand rupees.

8. No suit of any legal proceeding shall lie against any registered Medical Practitioner for any damage caused or likely to be caused by anything which is in good faith done or intended to be done under this act.

ANNEXURE

(Vide para 12 of the Report)

CLAUSES OF THE BILL AS INTRODUCED IN THE RAJYA SABHA WHICH HAVE BEEN AMENDED BY THE COMMITTEE

Be it enacted by Parliament in the twentieth year of the Republic of India as follows:

1. a. This Act may be called the Medical Termination of Pregnancy Act 1959.

   b. It extends to the whole of India except the state of Jammu and Kashmir.

2. In this Act unless the context otherwise requires
   a. Guardian, means a person having the care of the person of a minor or of his property or of both his person and property.

   b. Lunatic, has the meaning assigned to it in section 3, of the Indian Lunacy Act 1912.

   c. Minor means a person who, under the provisions of the Indian Majority Act, 1875 is to be deemed not to have attained his majority.

   d. Registered Medical Practitioner, means a medical practitioner who possesses any recognised medical qualification as defined in clause h, of section 2, of the Indian Medical Council Act 1956, and whose name has been entered in a State Medical Register.

3. 1. Notwithstanding any thing contained in the Indian Penal Code, a Registered Medical Practitioner shall be guilty of any offence under that code or under any other law

for the time being in force if any pregnancy is terminated by him in accordance with the provisions of this Act.

2. Subject to the Provisions of sub-section 4, a pregnancy may be terminated by .....

a. A Registered Medical Practitioner, where the length of the Pregnancy does not exceed twelve weeks

or

b. not less than two registered medical practitioners, acting together, where the length of the pregnancy exceeds twelve weeks, if such medical practitioners are, as the case may be, of opinion, formed in good faith, that .....

1. The continuance of the pregnancy would involve a risk to the life of the Pregnancy or if injury to her physical or mental health ; or

2. There is a substantial risk that if the child were born it would suffer from such physical or mental abnormalities as to be seriously handicapped

EXPLANATION I. ....Where any pregnancy is alleged by the pregnant woman to have been caused by rape, the anguish caused by such pregnancy shall be presumed to constitute a grave injury to the mental health of the pregnant woman.
EXPLANATION II. Where any pregnancy occurs as a result of failure of any device used by any married woman or her husband for the purpose of limiting the number of children, the anguish caused by such unwanted pregnancy may be presumed to constitute a grave injury to the mental health of the pregnant woman.

3. In determining whether the continuance of a pregnancy would involve such risk of injury to the health as is mentioned in sub-section 2, account may be taken of the pregnant woman's actual or reasonably forseeable environment.

4. a. No pregnancy of a married woman shall, if such pregnancy ie alleged by such women to have been caused by rape, be terminated except with the consent in writing of her husband, if he is alive, or of the guardian of her husband, if her husband is a minor or a Lunatic.

   b. No pregnancy of a widow, a minor or Lunatic, shall, be terminated except with the consent in writing of the guardian of such widow.

   c. No pregnancy of an unmarried girl, who has attained not the age of eighteen years, shall be terminated except with the consent in writing of her father or of her guardian if her father is not alive.

   d. No pregnancy of an unmarried woman, who being above the age of eighteen years, is a lunatic, shall be terminated except with the consent in writing of her guardian, if her father is not alive.

   e. Save as otherwise provided in this sub-section, no pregnancy shall be terminated except with the consent of the pregnant woman.

5. The provisions of section 4 and so much of the provisions of sub section 2 of section 3 as relate to the length of the pregnancy and the opinion of not less than two registered medical practitioners shall not apply to the termination of her pregnancy by a registered medical practitioner in a case where he is of opinion, formed in good faith, that the termination of such pregnancy is immediately necessary to save the life or to save permanent grave injury to the physical or mental health of the pregnant woman.[7]

It is interesting and worthwhile to note that the San Gregorio Family Planning Programme, has several differences with most family planning activities throughout the country but one of the most important seems to be the inclusion in the former of a strong education and service in proper balance. The educational message is addressed with particular emphasis to the groups that have .the highest risks of induced abortions. The greatest effort is concentrated in those women who have already had an abortion whose risk is from 2 upto 5 times greater than the

risk of the women who have never had an abortion. All patients who come to a first prenatal attention in San Gregorio clinics and who do not come back are visited at their homes in order to prevent a possible abortion. In the event that they have already had an abortion, a date for the prescription of a contraceptive is accorded. Other women are educated through conferences given to different groups of women organised in the San Gregorio Maternal and Child Clinic Primiparas Club, Mothers of Dystrofic Children Club, etc. (and in the community Mother's Centres, Cultural Centres, etc)

After the risks of abortion are clearly stated the women are informed about the existing methods of preventing pregnancy. They give complete and realistic information on this aspect.

All the pros and cons of each method of contraception are pointed out as well as of abortion. [8]

Abortion is negative. It is often the way of despair. It requires us to declare inferior a large section of the community who were previously deemed our equals. It is being legalised in many affluent countries despite the fact that the medical, economic and social reasons for it are probably less urgent now than they have ever been in human history.

As a result of the 1967 Abortion Act, abortions are now being carried out in U.K. hospitals and state-licensed private clinics of which there are about 50 at the rate of over 150,000 a year. We are rightly worried about the infant mortality rate between the eighth month of pregnancy and the second month after birth. We are worried also about the numbers of children killed on the roads. But the death rate during the first few months in the womb is many times higher. Those months have become one of the most dangerous periods in life, not because accidents happen and not because medical science is backward, but because of what doctors can deliberately and legally do, and do with increasingly sophisticated techniques.

Perhaps there has never been a society which accorded full rights to all its members. Wherever we look we find some section of every community regarded as inferior in some

way, and refused the status and privileges of first-class citizenship. Who the unlucky ones are has varied with time and place. In some societies, for example, it has been a slave class ; in others women ; in others a servile peasantry or proletariat. Very often religion has contributed its own forms of discrimination and oppression ; so too, of course, has racial prejudice. Men have never lacked reasons to exploit the weak, expel the unwanted, liquidate the despised.

Moreover, not only has all this usually met the approval of the majority, but there have commonly been enlightened and estimable people at hand to produce apparently excellent justification for what we would nowadays regard as wickedness. Thus Aristotle, a man of commendable humanity, proved at least to his own satisfaction that a large number of people were designed by Nature for slavery—and there was nothing one could do about it. Religious persecution has often been approved by men of intelligence and charity as necessary for the faithful and even good for the victims. Women have been openly treated as mere "dependents" and shown by experts to be "incapable" of higher education, political judgment, etc. Devout European Christians have tried to justify the slave trade, extermination of Indians, racial exploitation and rank colonialism, etc., by contending that the victims had no souls, were lower beings or merely "children". South African "Separate Development" is seen by idealistic supporters as offering a chance of Arcadian bliss for a section of their society obviously and permanently incapable of higher things. and so on. The list could be extended for pages.

Modern English society had probably come nearer than most to outlawing all forms of discrimination and (in theory at least) conferring full citizenship on all its members. But the Abortion Act of 1967 represents a serious setback to this progress. That Act invented a new class of inferiors and a new kind of discrimination in our society be declaring subordinate and disposable the life of the unborn child—who for centuries had been protected by law. A new apartheid has been enacted ; a fundamental moral right, namely, the right to life, has been

withdrawn from a large section of our community. The Act is exclusive, discriminatory, retrogressive.

Of course, the abortionist will deny this. To him the Act simply acknowledges the fact that the unborn child is not a full human being, He is a dependent life, a lower being, inferior, subordinate. The fetus is just a thing. Of course, it has not got a soul. Hence when there is a clash of interests between the child and the mother (or society at large) the child must give way. Morally, therefore, abortion is scarcely more significant than having a tooth out.

But all this has a familiar ring to it. This is the way that, time after time and all down history, man has tried to justify inhumanity to man.[9]

SOCIETY AND RESPONSIBLE PARENTING

The relationship of Society and Responsible Parenting is of importance to attainment of the quality of life, that is the goal of populption control for the families' benefit.

Socialization

"The basic logical principle which guides an evolutionary approach to man as stated broadly asserts, that everything that man does must. at some level, reflect his biological make-up and his evolutionary past, and that Man's cultural and biological nature are two aspects of the same macro feed-back system. Thus, although it is true that society and civilizations change with time, the conservatism of basic institutions and behaviour is necessarily matched by the conservatism of man's genotype - for they are indeed parts of the same phenomenon, the one we call man."[1]

Man is a social being and the child, though born without any prejudice, is born into a family that usually reflects the prevailing attitudes of society. The child is dependent

upon the adult members of the family for the satisfaction of his need and he is ultimately required to take over their attitudes and values. This he does through the process of socialization.

The Process of Socialization

One of the most significant and remarkable processes occuring in human beings is the transformation of the helpless infant into the mature adult. No other species goes through as long and as intensive a process of development, and in no other species is the contrast between the infant and adult so great. As he develops, the child learns one or more languages, a wealth of empirical facts about his physical and social environment and a variety of special skills and bodies of knowledge. He also acquires attitudes and values, some of them pertaining to moral standards and others that are ways of relating to people, such as loving or hating, helping other persons. This transformation takes place largely as a result of what have been termed socialization processes.

The principal agents in socialization are other persons, most notably the child's parents, teachers, siblings, playmates and other persons who are significant to him. Much of what the child learns in the process of growing up is not systematically and conscientiously taught. Parents do not generally define themselves as teachers, yet they sense this role. Most of what they teach is not conveyed with deliberate intent; nevertheless the child learns effectively (and often not to emulate his parents).

Socialization should not be thought of as moulding a person to a standard social pattern, however. Individuals are subjected to different combinations of socialization pressures and they react differently to them. Consequently, socialization processes can produce distinctive differences among persons, as well as similarities.

The parent-child relationship is unique. As it is the first relationship the child experiences, it provides the starting point from which all other relationships develop. The way in which each growing child feels about and behaves towards

his brothers and sisters, his aunts and uncles, his teachers and employers - and subsequently his own wife and children - are all a development of that first unique experience with his parents.

The first living experience of a vast majority of children takes place within a small group of people consisting of two adults and a few other children. Many adults are unaware of this. They do not recognise how much this first unique relationship affects their attitudes and behaviour towards the people they now come into contact with daily. All subsequent relationships are linked to a child's first experience in different ways.

The child rearing practices of a family may be identically repeated from generation to generation; they may be a variation upon that original relationship; or may even be a reaction against it.[3]

Conscience Formation

The socialization process produces profound changes in the individual. It establishes a set of behaviour standards and creates a wide variety of motive patterns and associated habits. Behaviour standards have their origin in the expectations that the other persons hold towards the child's behaviour. Gradually, the child adopts these as his own and at this point they are commonly referred to as the conscience.

Conscience is a system of norms that a person applies to his own acts or comtemplated acts to arrive at a judgement of their rightness or wrongness. Typically, acts that are wrong according to these norms produce feelings of shame or guilt which in turn lead to various behaviours intended to reduce guilt feelings. Actions in harmony with these norms either go unnoticed or produce positive feelings towards the self. Often, psychoanalysts refer to norms of that function in this way as internal controls. The entire process by which the norms of the parents are adopted by the child is known as **internalization**.

Social motives include such behaviour patterns as dependency, aggression and achievement: these arise from

certain socialization experiences. For example, a strong drive for achievement may be encouraged by parents who place stress on success, competition and ways of getting ahead.

A crucial first step in the socialization process is the following: **"The infant must become dependant upon another person who acts as a socialization agent**.

Unless acceptance by other persons is vitally important to the child, he will have little motivation for changing his behaviour in directions desired by them. The first prerequisite for the development of this dependency is the presence of another person. While children are usually born into families, and cared for by them, on occasional instances, a child has been relatively isolated during his early years because of parental neglect. In addition, being raised in some institutions, it may not experience the warm relationship normally established between child and parent. These children have been studied and compared with those socialized in a typical family.

Moreover, the older children who have spent their earlier years in an institutional environment exhibit more problem behaviour, more demands for attention and more aggression. They are retarded in speech development, mental development and educational performance. Children of similar background who spent their earlier years in a foster home instead of an institution do not show these forms of retardation.[4]

The family is the basic unit of society and therefore the life of a family will reflect the tenor of society life and no less - the state of society itself will be determined by that of the family.

With this perception of family. the parents and children who compose a unit becom very significant. Moreover, the relationship between parents and children in the nuclear or simple family assumes great importance. A continuing and constantly growing dialogue characterizes a healthy relationship ; but should the parents be lacking in quality of their parental role. the children, especially when young, become 'deprived' to varying

extents depending on the nature and length of withdrawal of this parental sustenance.

The Deprived Child

It has been found that the home background of children with behavioural problems is often characterized by extreme parental neglect.

"Understand and love your children better"... has been suggested as the eleventh commandment. It may be that there is a certain minimum capacity in parenthood below which children start to suffer. And maybe some people are not good parents, because their own parents also made mistakes.

Deprivation takes many forms, and they interact. It shows itself, for example, in poverty, in emotional impoverishment, in personality disorders, in poor educational attainment, in depression and despair. The most vulnerable - those at the bottom of the economic and social scales - are those most likely to be affected. These are also the causes. So too are many factors which affect the way we bring up our children. When a child is deprived of constant love and guidance he is deprived of that background most likely to lead to stability and maturity.

Among the children of this generation there are some doomed, as their parents were, to an uphill struggle against the disadvantages of a deprived family background. Many of these children will not be able to overcome the disadvantages and will become in their turn the parents of deprived children.

Children in trouble have an imbalance in their background, whether it is an excess of discipline, of poverty or permissiveness. Interparental barriers are at the root cause of such situations.[5]

Animal research has shown that environments involving restriction of one kind or another often affect the organism adversely. It is difficult, however, to identify the exact conditions responsible for the negative effects Several factors have been suggested as the primary causes.

1. The **absence of a mother or mother substitute,** resulting in lack of opportunity to form a close attachment to an adult, distorts or prevents later relations to others.

2. The **restricted sensory stimulation** interferes with the formation of perceptual categories, symbols and concepts.

3. **Infancy is a critical period** during which certain stimulation and experience must be available for normal maturation. For example a chimpanzee raised in complete darkness shows deterioration of the cells of the retina. Apparently without the stimulation of light the visual mechanism does not develop properly.

These interpretations are not mutually exclusive in fact, they might all be operative.

Why adverse effects of early experience are not corrected by later learning requires explanation. In the first place early reports probably exaggerated the extent to which such effects were permanent and irreversible. (Pinneau, 1955). More thorough studies suggest that at least some degree of recovery is possible. But there are good reasons why the effects of early experience might persist. Beach and Jaynes (1954) have suggested several.

1. Initially learned responses might interfere with learning later ones.

2. Habits learned earlier might be more persistent because of the greater strength of drive during infancy.

3. The age at which certain characteristics are acquired might be critical because of the maturation of the organism at given age periods.

The last point refers to the so-called critical period hypothesis. Recent evaluations of this hypothesis are that the range of the critical period during which learning must take place is somewhat broader than had been thought at first (Caldwell 1961 ; Riesen 1961). In fact, it has been suggested that what is more significant is not the age at which a behaviour is learned, but whether or not the organism has been provided an opportunity

to acquire certain experiences. At least it is clear that these essential conditions are unlikely to be met unless the child has an adequate relation to another human being.

Child care, according to the Libbers,* is 'culturally assigned to women'. It is conceivable that a society could exist where women handed the children over to men the minute they were born. But *who is more likely to be most strongly orientated emotionally to baby feeding and child rearing – the woman for whom the child has been a part of herself for nine months, or the man whose role is peripheral ?*

The fact that the pattern of child care by women has been culturally reinforced does not render it any the less natural. Any alternative social pattern of child care by men would not merely have to be culturally reinforced – it would have to be culturally created from scratch, with no biological basis on which to build.

The Libbers would have the care of children left to the best trained practitioners of both sexes who have chosen it as a vocation; their view shows a total lack of insight into parent's feelings towards their children.

"*Calvin wanted to turn the world into a monastery*; *Women's Lib want to turn it into an orphanage*"[2]

Kerstin Hook cites a formulation of those conditions favourable to normal development by Blomberg–**To be born in wedlock, to grow up in a steadfast home environment in the company of both parents and under satisfactory economic condition, to be given an upbringing that does not go to extremes in the direction of either laxity or of severity, and to escape exposure to the influences of asocial or in other respects abnormal behaviour on the part of normal persons**.

Much propaganda about family planning is directed towards the prevention of "unwanted" pregnancies. To assume that selfish motives are the only ones that count is to ignore a crucial aspect of man's identity : his identity as a moral being.

*Women Liberation Movement

In general, the couple or individual parent tries to avoid having a family size that is inconsistent with his preferred identity. And he is usually successful. There is abundant evidence for the view that *motives* are far more important than methods for the control of fertility.

Much more stress on the *Needs of Children*, including *Wanted Children*, might have more effect on behaviour in many cases.

Also, as noted by Pohlman, a major problem studying adverse effects of unwanted pregnancies is that "unwanted" at time of conception become "wanted" by the time of birth.

Since, in many societies, illegitimate births are unwanted, the mortality and morbidity of the unmarried mother and her child have been studied. Virtually every available measure shows that they face significantly higher health risks than the married mother and her child, even when allowance is made for socioeconomic factors. Other studies have examined children of mothers whose application for therapeutic abortion was refused. An investigation in Sweden in which 120 subjects were followed to the age of 21, found, in general, a high incidence of anti-social and criminal behaviour, a greater need for psychiatric care and more educational subnormality among unwanted children, than in a control group. It has frequently been suggested that emotional stability and behaviour are influenced by events during early life, and it would be of great interest to monitor emotional development.[8]

Origins of Dependency

The behaviour of other persons acquires reward value for the child through repeated association with satisfaction of his physical needs. As a result, he comes to desire the constant presence of the person who administers to his physical needs (normally the mother). He strives to gain her attention help and affection because it is rewarding. He gradually learns that if he acts in ways she approves of, he maximizes the rewards he receives from her. In addition he learns to react with anxiety when she withdraws her support or approval. Various negative or

disapproving actions on her part are signals that he might be deprived of the satisfactions she normally provides. When such situations occur, the termination of anxiety when disapproval is lifted is rewarding and probably deepens his attachment to her. Eventually the mother becomes a generalized reinforcing agent. Almost everyone has observed the power of a mother's comforting actions to soothe a crying frightened child.

In experimental studies of college students, it has been shown that the desire to be with others, often referred to as the *need for affiliation* (Murray, 1938) increases when the student is made anxious. Moreover, in several studies but not all of them, the strength of this form of dependency in the presence of anxiety was related to whether the person was the firstborn or later born child (Schachter 1959, Glass 1963 etc.). While the explanation of this finding may take several forms, the demonstrated relation underlines the point that early socialization experiences are significant determinants of dependency in childhood. In short, dependency appears to originate from a twofold process. The child gradually learns both that the presence and approval of the socializing agent is generally rewarding and that the absence or disapproval of the socializing agent is anxiety arousing.

Strength of the Dependency Motive

Children vary in the strength of the dependency behaviour they exhibit. For example, Sears, Maccaby and Levin have attempted to relate dependency to child rearing patterns. On the basis of interviews with mothers, they rated features of the mother's behaviour and that of the child. They concluded (1957):-

"When there was little reward for dependency, the amount of punishment for such behaviour did not seem to make much difference in the amount of it that occured. Only when punishment was superimposed upon fair amount of reward was there an increase in the child's tendency to show the very behaviour he was punished for. Looked at another way, reward for dependency had a tendency to increase dependency only when it was superimposed upon punishment for the same behaviour."

Punishment interspersed with reward produces a stronger dependence need than reward alone. But in the absence of reward the pain of punishment or fear of it is insufficient to produce strong dependency. Punishment from a loving parent is effective because it represents withdrawal of love. At the opposite extreme a parent who greatly indulges his child, never exhibiting disapproval, would be expected to establish a weaker dependency than one who frequently rewards his child and also occasionally exhibits disapproval or punishment.

Warmth, Love -- Oriented Discipline

Unless the child becomes physically and emotionally dependent upon another person, socialization will be impaired. In the typical family the development of dependency is assured by the nature of family interaction, which necessarily produces strong dependencies as well as occasional frustration and conflict. In extremely atypical families, or in the case of institutionalized children, only a weak dependency may develop.

Given a warm relation between parent and child, psychological forms of discipline are effective in producing appropriate internal controls in children. Child-rearing practices vary with the position of the parents in the social structure and the consequent effects of these variations upon child behaviour are consistent with the general principles governing the establishment of dependency and internal controls.

Two highly significant social motives, aggression and achievement, have been discussed at some length. In early childhood, high permissiveness and high punishment on the part of the mother lead to maximum aggression, while low permissiveness and low punishment produce minimum aggression.

Strong achievement motivation, more characteristic of middle-class children than of lower-class children is produced by direct tuition, reward and identification with achievement-oriented parents. Variations in achievement motivation are also found in various racial and ethnic groups. Certain aspects of family structure relate to achievement including

family size, birth order, age of the mother, and the power structure of the family.

Present knowledge of socialization is limited in several ways. Few longitudinal studies following the development of individual children have been carried out.

Association between Mother's Behaviour and Aggressiveness in their children

Mother's Behaviour	*Percent Highly Aggressive*	
	Boys (N = 195)	*Girls (N = 162)*
Low permissiveness and low punishment	4	13
Low permissiveness and high punishment	20	19
High permissiveness and low punishment	25	21
High permissiveness and high punishment	42	38

Note : Both columns total only 91% because in a few cases the mother's behaviour could not be classified on the basis of available interview data.

The very nature of human interaction in the family is likely to provide appropriate conditions for the optimum development of consciences. Almost all persons living together intimately are likely to develop strong attachments to each other and yet are also likely to frustrate each other's needs at times. Children, in particular, do not have the sources of emotional support outside the family. Yet they have unsocialized needs that have to be controlled by their parents. Thus the prerequisites for conscience development, warmth and frustration of needs are present in the typical family.

The child in interaction with other persons then learns what conduct they expect from him. From their expectations, he forms a set of verbal rules that he applies to himself. Sometimes one can directly observe these rules being applied as when small children admonish themselves aloud. But by the time adulthood is reached, the "voice of our conscience" has become subvocal.

Internal controls will be maximized under the two conditions that maximize dependency and identification : the establishment of a warm relationship between child and parent, and the use of love-oriented discipline.

Several lines of research support the view that psychological or love-oriented discipline is more effective than physical punishment in developing conscience. In psychological discipline the parent uses the affectional bond between him and the child to gain control over him. When a warm relation was combined with psychological discipline however, strength of conscience was maximized. The children having mothers who were relatively warm towards them, but who made their love contigent on the child's good behaviour, appeared to have the most well-developed consciences. Another study reports that guilt arising from feelings of anger was greater among boys whose mothers used psychological punishment than among boys whose mothers used physical punishment. (Allinsmith and Greening 1955).

Cross-cultural studies also support the view that *love-oriented discipline, in contrast to physical punishment or threat of punishment produces a strong conscience.*

The conclusions may be drawn that conscience formation is a joint function of development of a warm relation to a parent and the use of love-oriented discipline. In the absence of warmth, love-oriented discipline cannot be used and internal controls are difficult to produce. Even when warmth is of sufficient strength, the use of physical instead of psychological punishment will impair development of the conscience.

Social Class and Dependency Training

Bronfenbenner in his review of literature on social class and child rearing, notes that at present, middle class parents are more affectionate than lower class parents towards young children and that they more frequently use withdrawal of love as a technique of punishment. Such a combination should maximize the development of internal controls.

The successful use of withdrawal of love as a discipline technique implies the prior existence of gratifying

relationship; the more love present in the first instance, the greater the threat implied in its withdrawal. Kohlberg (1962) has pointed out that middle class children participate more extensively in various group activities and he has presented evidence that such participation may play an important part in producing class differences.

Another convincing interpretation has been offered by Kohn (1963). He suggests that the middle and working classes have different values because their conditions of life are different and that these values in turn produce differences in their child rearing practices. The essence in the difference in values, according to Kohn, is that working class parental values centre on conformity. to external proscriptions, middle class parental values on self-direction. "To working class parents it is the overt that matters ; the child should not transgress externally imposed rules ; to middle class parents, it is the child's motives and feelings that matter ; the child should govern himself"[9]

Reference Groups and Social Control

Reference grounds refers to the sources of values–selected by an individual for the guidance of his behaviour especially when a choice has to be made. Reference groups may be groups of which the individual is a member but they sometimes may not. In all cases they provide direction for the behaviour of the individual concerned and so constitute important sources of social control. "If a man does not keep pace with his companions, it is perhaps because he hears a different drummer."[10]

Persons form groups to satisfy a variety of needs. Normative controls arise in the areas of behaviour where members have become dependent upon the need for group satisfaction. In groups that have primarily a task function, for example, norms develop to ensure co-operative action and to establish consensus on attitudes relevant to goals. In groups that have predominantly a social emotional orientation, behaviours providing emotional support, friendship or love are more likely to be subjected to normative control. Attitudes and behaviours that are neccessary to the satisfaction of the most powerful persons in the group are apt to be supported by norms.

Deliberately, intuitively or unconsciously, each person performs for some kind of audience in the drama of

life, as in the theatre, and conduct is oriented towards certain people whose judgement is deemed important. A basic human requirement is the need for validation of one's opinions by others. In a complex society like ours, in which there are so many audiences, it often becomes necessary to identify the one for which an individual is performing in order to make his behaviour comprehensible. The current popularity of the concept of 'reference group' rests in part upon its utility in explaining behaviour that is oriented towards audiences that are not obviously represented on the scence.

Sociologists have long been concerned with audiences, for they usually explain conduct in terms of social control. Social control refers not so much to deliberate influence or to coercion but to the fact that each person generally takes into account the expectations that he imputes to the other people. This is normative function of reference groups.

According to Mead, each socialized person is then a society in miniature. Once he has incorporated the culture of his group, it becomes his perspective and he can bring this frame of reference to bear upon all new situations that he encounters. The fact that most people are able to control themselves in this manner is what makes society possible.

Dewey, Park and Sapir emphasized that society exists in and through communication. Shared perspectives are the products of common communication channels.

Each social world then, is a cultural area, the boundaries of which are set neither by territory nor by formal group membership, but by the limits of effective communication.

Studies of social solidarity also reveal that conformity to group norms is related to favourable interpersonal relations. Since each person is capable of independent action, the persistence of any groups depends upon the continued conformity of the participants to its norms. When enough persons defect, the collective pattern collapses.

To understand what a man does, we must have some appreciation of his definition of the situation and this requires knowing something of what he takes for granted. Being able to identify the audience for whom a man is performing therefore becomes task of decisive importance.[10]

Groups are not so homeogenous; nor are the communication channels so uniform, that people are never exposed to contrary communications. A person in modern society is continually bombarded with a great variety of messages, many of them contrary to his attitudes. Perhaps the most dramatic source of resistance to the continual pressure is found in the social support provided by his group. This support is one of the most important reasons why his attitudes do not constantly shift in the direction of each new barrage of communications.

A laboratory experiment has shown that placing a high value on one's group is associated with resistance to communications running counter to the group's values.

A Group Decision to decide how to act and develop an attitude is important to implement any change. Members of the group are "given the opportunity to see how many others agree to try out the new actions, a procedure known as perceived group consensus."

Possible Effective Factors in Group Decision as Compared with Lectures.

Group Decision	*Lecture*
Audience actively participates and is likely to become personally involved	Audience is passive; does not participate.
Members perceive willingness of some other members to unfreeze attitudes	Audience is silent; members cannot perceive inclinations of others
Leaders' permissive attitude toward objections may strengthen desire to help him by behaving in the manner suggested	Audience does not participate; hence leader cannot win support by being permissive.
Members are required to commit them on the desired action	Audience is not required to make decision on desired action.
Members perceive others committing themselves to desired action	Audience is unable to perceive private decisions of others.

Society and Persuasive Communication

Groups gain a part of their strength from their position in the larger society. Thus their relation to the larger society is an important determinant of the extent to which they support the individual in resisting attitude change. Similarly, the position of the opinion leader in the larger society often determines the effectiveness with which he influences his followers.

The social structure and the values of society determine the effectiveness of communications in two general ways: through control of exposure to communications and through the ability to manipulate reward and punishment. Where these conditions are maximized, we may refer to the persuasive process as being coercive.

Communication situations are structured in terms of the value structure of society. In particular, communication in totalitarian societies is likely to be more one-sided and more compelling than in democratic societies, where more dissent is permitted.

The much smaller amount of opinion change occurring in survey studies as compared with laboratory studies of persuasive communication can be explained by such factors as the role of groups in attitude change, the flow of communication, and certain other conditions characterizing persuasive communication in everyday life. Evidence has been presented to show that primary groups provide strong changes for many opinions. A person need not be a member of a group in order to derive support from it: groups which he identifies with serve as a frame of reference for his attitude.

Groups may also serve as agents of change. Factors that create dissention or weaken the group prepare its members for accepting counter-norm communications. In particular, the perception that other numbers are committing themselves to a change and the making of a decision to change are effective factors in bringing about attitude shifts.

Person-to-person communication has been shown to play an important role in mass communication. Mass

communications sometimes follow a two-step pattern, from the communication to the opinion leader and from the opinion-leader to other persons. In this process, the opinion leader serves not only to relay the information, but also as an influence agent.[11]

Social Mobility

Social mobility is of more than academic interest. The question of what opportunities are available to individuals in society will clearly have implications for both the satisfaction of the individual's needs and aspirations and for the attachment which individuals have for their society. Social mobility rates also tell us something about the openness of a society and therefore contribute to political, philosophical and moral discussion of fairness, justice and efficiency in social arrangements. For the sociologist, these aspects of social mobility are an important background but not the substance of the subject. Sociologically, the problem is first to define, next to measure and then to investigate and explain the causes and variations in social mobility.

If societies are conceived of as networks social relation-ships, that is, interactions between individuals in various social positions, then it would make sense to conceive of social mobility as movement of a given individual from a given position in the network to another.

The concept of social mobility is restricted to movements from one position to another in a system of social stratification. Systems of social stratification may be broadly classified as follows : caste, estate, class and status. Castes are hereditary, endogenous occupational groups arranged in a hierarchy indicated by ritual distance from the topmost or dominating caste.

The Unit of Social Mobility

Mobility may be thought of as an attribute of the biographv of individual persons. It is usually more realistic to think of the nuclear family as the appropriate unit, i.e., parents

and their dependent children. But it is also possible to think in terms of larger units, i.e., to consider the movement of whole strata, for example in the rise of gentry in Britain in the 14th century, or of other groups, for example sub-castes. There is similarly the question of what time-span is considered to be appropriate within the individual. However, for family or larger units longer time intervals may be considered, extending over many generations.

The measurement of Social Mobility

Some sociologists have used multiple indices of class, status or social class including occupation, source and type of income, home address, etc.

Most studies have used occupation as the index of stratum position. This device is sensible, **first** because occupation is highly correlated with the determinants of social class and status, 'including income, education, styles of life and social attitudes.

Second, a large number of studies have shown consensus about the ranking of occupations in a hierarchy of desirability or 'goodness' of jobs which is similar in many different kinds of industrial country. **Third** it is a convenient and more or less objective attribute of adult males.[12]

Social Mobility meant the movement of persons from one position in the social order to another, from one class of socio-economic status to another. It is a mechanism that occurs in all societies. Through social mobility, the possibility of achieving personal goals existed.[13]

It was recognized that there were the following major areas of importance in the analysis of social mobility : (a) amount of mobility (b) career mobility within the individual's life experience (c) mobility differences between generations, (d) social distance between statuses of origin and destination, (e) type of mobility such as that induced by industrial or demographic change (structural mobility) or that induced by the voluntary movement of individuals (circulation mobility).

TABLE OF SOCIAL CLASS

Class I : Principals, Professors, doctors, lawyers, engineers, military officers, such as captains and majors, senior executives and business proprietors (monthly income above Rs. 800).

Class II : Junior executives, higher secondary school teachers and small businessmen (monthly income Rs. 401-800).

Class III : Clerks, primary school teachers and skilled labourers such as mechanics, electricians and railway guard (monthly income Rs. 151-400).

Class IV : Unskilled labourers such as peons, sweepers, porters, shoemakers, washermen and domestic servants (monthly income Rs. 50-150).

Prasad (1970) suggested the following social classification for use in India :

Family Occupation	*Per Capita Monthly Income*
Social Class 1 :	
(a) Professional workers of high status	
(b) Well-to-do trading and agricultural class	Rs. 300 and above
Social Class II :	
(a) Professional Workers of intermediate status	
(b) Intermediate trading and agricultural class	Rs. 150-299
Social Class III :	
(a) Service class like clerical workers	
(b) Small traders and agriculturists	Rs. 70-149
Social Class IV :	
(a) Skilled artisans and analogous workers, etc.	Rs. 30- 69
Social Class V :	
(a) Petty agriculturists, labourers and other unskilled workers	below Rs. 30

In developing countries, some occupations are characteristically traditional and others are relatively modern. In view of that fact, attention should be given to lateral social mobility between the traditional and modern sectors as well as vertical social mobility. Since the fertility behaviour in the two categories might be substantially different, it was felt that there was additional reason to study lateral mobility.

In discussing the traditional barriers or facilitators of social mobility, mention was made of the existence, in a number of countries of the *caste system* as an impediment to social and occupational mobility. In other parts, similar caste groups, ethnic minorities or linguistic groups were subject to social barriers or created social barriers. Even in developed countries, certain lower socio-economic groups continued to have less access to certain social and educational facilities as well as to desirable jobs.

Lack of education was a major impediment to social mobility. For example, a great majority of the lower caste, was landless and had few other resources and therefore were not able to obtain education adequate for generating upward social mobility.

Some traditional occupations, if suitable developed, could contribute to modernization, thus enhancing gradual and purposeful occupational mobility.

In general, and over the long run, small family size contributed to overall mobility. However, at early stages of development, somewhat larger families could facilitate mobility because of their ability to mobilize group capital but that was predicated on an advantageous man to land ratio.

Modernization and development had a definite influence on the improvement of the status of women, who, in a number of countries assumed important and dominant roles in the economic as well as social life.

There was evidence that, in the developing countries of Asia, occupational mobility promoted nuclearization of the family system, but Francois Houtart divides Indian society into three major groups : the upper class which is 5%, the middle class which is 10% and the 85% lower class. The lower majority group are more traditional. The middle class are assuming identity roles, especially those who are socially mobile and are likely to shift or change their social position. The upper class believe they are born into a separate state "willed by God."[5]

Strong ties, in the economic as well as in the psychological sense were usually maintained with the extended family.[16]

Social System

A social system is a group of related social roles. Each position in a social system has one or more counter-positions. Persons occupying these counter-positions are known as role partners.

Role Strain

Role strain arises in a particular system in part because the positions are so organized that it is possible for a person to occupy simultaneously two or more positions which subject him to conflicting expectations. Strain may arise where a system is so organized that the position an actor successively occupies involves conflicting expecations.[17]

Imbalance in Role Rights and Obligation–The Working Mother.

Where the source of strain arises out of inequality in the rights and obligations of reciprocal roles, tendencies develop within the system toward the development of a more equitable balance. Such pressures toward modification of existing role obligations occur either when the position occupants are inadequately motivated to fulfil their obligations or when because of frustration they engage in behaviour that interferes with the need gratification of their role partners.

For instance, where the wife is employed outside the home and the husband continues to play the traditional role of husband, the wife finds herself saddled with full responsibility for the care of the children and the household as well as her job outside. This may result in a threat to withdraw from the relation, or refusal to bear the responsibilities, or bickering, nagging and withdrawal of emotional support from the husband. If such a state of affairs becomes painful enough for the husband, he will gradually modify his role behaviour toward her (e.g, he may share in household duties etc.) which in turn will reduce the wife's frustration to the point where a new equilibrium between the rights and obligations of their respective roles is established. Such a re-adjustment in rights and obligations can also be seen in larger social systems.

When mothers with infants of young children leave them for considerable periods in the day to work (some do so for social reasons, and are a separate entity) children are often the innocent sufferers. This happens especially when there is no substitute mother figure, and when the mother focuses her whole energy on her job outside the home. The child is thus deprived of her physical care and what is more important, her emotional attention. This neglect is not mitigated by the view or the fact that the mother is improving the economic position of the family.

When she returns home tired, both physically and mentally, the children, often several in number and closely spaced, are "burdens" to her, and this is not unnaturally, conducive for their wholesome development.

Most parents will feel overwhelmed by the burden of their role. They will feel the full weight of their obligation to provide for the full range of their children's development, emotional and spiritual, in addition to the physical and intellectual. So far, the studies have tried to show that where parents have been able to develop realistic relationships with their children, they in turn respond to their parents by honouring them; and that in doing so, they, the children, receive blessings from God.

some tentative formulations of the indicators of social development as well as of the quality of life are beginning to emerge.

Three Major Functions

Economic development, while it is undeniably necessary, can lead to certain undesirable consequences unless it is geared to specific social objectives. Growth rate, GNP, and per capita income figures can be deceptive; the impressive facade of their growth in a society often hides ugly realities of social retardation and degradation of sizeable groups. It is time we start thinking in terms of GNW (gross national welfare) as the Japanese are doing.

The objective calls for (a) *redefinition of social goals in terms of the quality of life;* (b) *formulation of indicators to assess social trends and to evaluate social progress; and* (c) *creating a redistributive institutional structure for the attainment of the new social objectives and evolving a broad strategy for organisational and value change to ensure speedy attainment of the redefined social goals.*

Disenchantment With Affluence

The social inadequacy of economic growth is visible in some of the richest countries of the world. It is evident that affluence, while solving some problems, generates a wide range of baffling problems. Disenchantment with the culture of affluence often finds expression in dissention and protest, in anomie and alienation and in endeavours for counter-cultures and new utopias. Many of these affluent societies have not been able to find a solution to the problem of inequality.

Our greatest investment should be made in the interest of our children. For at stake is not material wealth and its pursuit, but something much richer and more meaningful, which is the quality of life. It is for this alone that man must strive, for this alone can truly satisfy and endure.

With the inspiring words of Rabindranath Tagore let us hope —

Where the mind is without fear, and the head is held high;
Where knowledge is free;
Where the world has not been broken up into fragments by narrow domestic walls;
Where words come out from the depth of truth;
Where tireless striving stretches its arms towards perfection;
Where the clear stream of reason has not lost its way into the dreary desert sand of dead habit;

Where the mind is led forward by Thee into ever-widening thought
Into that heaven of freedom, my Father, let my country awake.

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PART III

POPULATION AND EDUCATION

Education

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